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Virginia MEDICAL MONTHLY

OFFICIAL PUBLICATION OF THE MEDICAL SOCIETY OF VIRGINIA

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Virginia Medical Monthly

Vol. 75, No. 8
WHOLE No. 1154

RICHMOND, VA., AUGUST, 1948

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GUEST EDITORIAL

Virginia Assembly Looks at Solicitation of Funds for Medical Care

THE 1948 Virginia General Assembly, through House Bill 122, named the State Corporation Commission as an agency to require reports, estimates, facts and other data from those agencies operating on a State-wide basis in Virginia that exist primarily for the solicitation of funds from the public for medical care.

Requirements of the law include a statement of how funds were spent in the past, what proportion was consumed in the solicitation campaign, for administration, what proportion remained in the State, and what percentage is customarily transferred outside the State.

The bill also provides that the State Corporation Commission would have to assist it an Advisory Board, composed of "the State Commissioner of Health, the Commissioner of Public Welfare, the Superintendent of Public Instruction, the Commissioner of Mental Hygiene and Hospitals, a representative of the Medical Society of Virginia appointed by the Governor, and two members of the public appointed by the Governor from the State at large."

In substance, this legislation places with the State Corporation Commission the responsibility of approving or disapproving such agencies as are referred to above. Those appearing to be satisfactory would pay an annual certificate fee of $25, renewable annually prior to August 1.

For several years some Chambers of Commerce and perhaps some units of municipal government in the State have been interested in this type of analysis of such agencies.

It is deemed that the General Assembly is the proper agency to regulate these matters which so vitally concern the giving public and medical needs of our people. This will represent the first State-wide protection and assurance that the public has had in its appraisal of these agencies and the worthiness of their causes.

Although it should not be predicted here what course the State Corporation Commission will follow in administering this law, it is believed that the intent of this bill was not to reduce contributions from the public for medical care, but instead to increase these by establishing greater confidence on the part of the public in these agencies and the use to which these funds are put.

It is hoped that the Advisory Board, representing, among others, those who would be expected to be especially interested in health and medical care, can render a real service to the State Corporation Commission by its advice, not only on items pertaining to compaigning for funds, but in an approach to a more equitable distribution of these according to our health and medical care needs in the State.

This legislation should present a challenge to medical men in Virginia and others interested, to render every assistance in fund raising and fund spending wherever

needed, to the end that our people may get the medical care they need through funds provided by the public, in instances where they are unable to provide such funds themselves.

HENRY S. JOHNSON,
Director, Public Relations,
Medical Society of Virginia

Bibliotheco Obstetrica

VON SOEMMERRING, SAMUEL THOMAS (1755-1830): Icones embryonum humanorum. Francofurti ad Moenum, Varrentrapp u. Wenner, 1799. 10 p. Two large engraved vignettes by F. L. Neubauer on title-page. Two large engraved plates drawn by Christian Köck, one by the brothers Klauber and one by Hüllmann. 59.8 cm.
——: Abbildungen und Beschreibungen eiginer Misgeburten. Mainz, Universitätsbuchhandlung, 1791. 38 p. engr. 33.5 cm. (M.L.)

Soemmerring met William Hunter while on a visit to London in 1778. He was so impressed with Hunter's Anatomy of the Human Gravid Uterus, that be brought out the Icones embryonum humanorum dealing with the appearance of the embryo in the first half of pregnancy as a supplementary volume to Hunter's work. It is one of the best illustrated of Soemmerring's works. Achondroplasia is first described on page 30 and pictured on plate 11 of the Abbildungen and Beschreibungen eiginer Misgeburten.

Soemmerring, one of the great anatomists, was the son of a German physician. He was born in Thorn, Poland, and studied under Wrisberg at Göttinggen and Camper in Holland. His ideal was Albinus who had stressed the importance of portraying the anatomic norm. He was an artist in his own right and he trained Christian Köck to make anatomic drawings under his direction. He held professorships at Cassel, Mainz and Munich. He made important researches on the brain, the eye, the ear, nose and throat, hernia and the anthropology of the negro. Probably he is best remembered for his classification of the cranial nerves. The pudendal nerve sometimes goes by his name. He was also one of the inventors of the electric telegraph. His picture may be found in Garrison's history of Medicine and also in the Annals of Medical History (1924,s.1,VI, facing 363).

THE ROLE OF AMMONIUM CHLORIDE AND OTHER ACID PRODUCING SUBSTANCES IN THE TREATMENT OF CONGESTIVE HEART FAILURE*

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and
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Acid ash diets and other acid producing substances have become increasingly popular as therapeutic measures for congestive heart failure during the past five years. This is largely due to the fact that these measures facilitate elimination of the sodium ion. Renal retention of this ion has been shown to be of near primary importance in the pathogenesis of congestive heart failure.

It is the purpose of this paper to delineate some of the theoretical and practical aspects of the application of these substances. More specifically, the aspects to be considered are: (1) The manner in which the body handles acid producing substances as a basis upon which to choose between their intermittent or continuous administration, also to give a plausible explanation for the seeming synergism between acid producing substances and mercury and xanthines; (2) The low sodium *versus* the acid ash diet; (3) Indications, contra-indications, dosage and routes of administration of the chemical preparations involved.

Ammonium chloride and dilute hydrochloric acid are the only acid producing substances which will be discussed. The major portion of the presentation is based on information derived from the literature, though observations made in this laboratory and clinic are included.

In order to approach the problem of how to make best use of the acid producing substances, one must have a knowledge of the manner in which they are handled in the body. Since ammonium chloride is the most widely used member of the group, it will be used as the reference substance for discussion. Following ingestion, ammonium chloride is presented from the upper gastrointestinal tract to the liver. The liver rapidly converts the ammonia ion to urea, leaving the chloride ion to be covered by fixed base which is derived from the alkali reserve of the extracellular fluid. The resulting changes in blood chemistry show an increase in plasma sodium chloride concentration and a decrease in plasma carbon dioxide combining power. The kidney begins immediately to eliminate the excess chloride. Since chloride is derived from the strong acid hydrochloric, it must be covered by a basic ion as it enters the urine. Sodium constitutes ninety-two per cent of the extracellular base thus chloride entering the urine is largely covered by sodium. For each 142 milliequivalents of sodium removed in such manner, the extracellular spaces must give up one liter of water (edema in the heart failure patient) in order that isotonicity of extracellular fluid may be preserved. Unfortunately for the edematous subject, the kidney does not continue to eliminate the chloride mainly as a sodium chloride. Within three to six days the kidney begins to produce ammonia from glutamine[1] and this ammonia is substituted within the renal tubules for sodium, allowing the latter to re-enter the extracellular fluid If ammonium chloride be continued, the point is reached within five to ten days where ammonia covers nearly all of the urinary chloride[2]. At this time the powerful diuretic action of ammonium chloride is lost, although continued slight diuresis is maintained by the osmotic diuretic effect of the ammonium chloride which is being excreted. Also, a lesser diuretic mechanism which obtains throughout the period of ammonium chloride administration is the osmotic diuretic effect of urea, formed from the ammonia ion by the liver[3]. The above mechanisms of the diuresis induced by acid producing substances, while not totally adequate, do seem to explain more of the observed events than other mechanisms which have been offered.

Other acid producing substances may be fitted into the above scheme. Hydrochloric acid, calcium chloride, ammonium sulfate, ammonium nitrate, and

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Read before the Medical Society of Virginia at its annual meeting in Roanoke, October 15, 1947.

magnesium sulfate are handled essentially in the manner described above.

Therefore, intermittent administration of these substances should, by catching the ammonia producing mechanism of the kidney off guard, force more rapid elimination of sodium than continuous administration. This point is hard to prove but most observers seem to be in agreement that such is the case. Dr. P. D. White advises continuous administration[4]. Our experience with each method has been considerable, and we now use the intermittent method solely.

Apparent synergism between acid producing substances and mercury or xanthine diuretics has long been recognized. We have shown that either mercury or xanthine induced diuresis is accompanied by a disproportionately large increase in urinary sodium[5]. It seems plausible, therefore, that the mechanism of the synergism is the combination of the two influences, both acting to prevent tubular reabsorption of sodium. A corollary of this theory is that mercury or a xanthine should work best when given with an acid producing substance before the ammonia mechanism has been awakened, (e.g., first three days of acid producing substance administration). We have the clinical impression that this is true.

The important clinical points to be considered before using these substances are: (1) The relative state of cardiac competency; (2) The state of extracellular fluid and its electrolyte content; (3) Renal function; (4) Liver function when ammonia containing substances are to be used.

At one extreme is the mild heart failure patient who responds rapidly and well to rest, digitalis and a low sodium diet. Acid producing substances are usually superfluous in this type patient. At the other extreme, is the patient with severe cardiac failure who, in addition to having the usual heart failure picture, also shows clammy skin, marked oliguria, and semi-stupor. This patient excretes chloride very slowly and his kidneys seem to have reduced ability to produce ammonia. He goes quickly into uncompensated acidosis on routine dosage of acid producing substances. This point is illustrated by the case of a forty-one year old male, with normal renal function, who was given eight grams of ammonium chloride daily and within two weeks developed Kussmaul breathing and showed a carbon dioxide combining power of nineteen volumes per cent. It was necessary to stop ammonium chloride administration and to give sodium lactate to correct this. It is much wiser to recognize these patients as likely subjects for uncompensated acidosis and to check the effect of small doses of acid producing substances by freqeunt determinations of the carbon dioxide combining power.

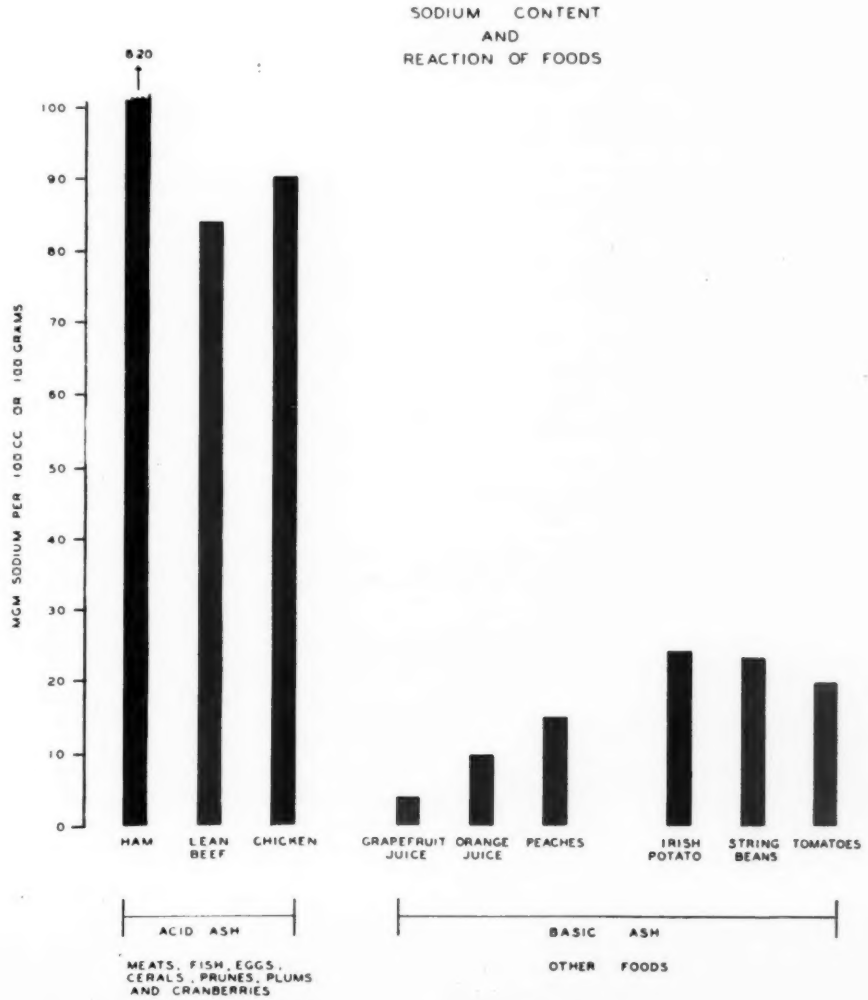
Frequently an edematous heart failure patient is helped to regain and to maintain cardiac compensation by continued intermittent use of acid producing substances and a low sodium diet. In spite of the evidence suggesting that this type patient always has an increased extracellular fluid volume[6], it has been our experience that any complication which makes appreciable inroads on extracellular fluid and its electrolyte is poorly borne in such an individual. Such complications as bouts of vomiting, diarrhea, diabetic acidosis, excessive sweating due to a hot humid environment, or, most important of all, an operation, may quickly lower extracellular fluid volume and electrolyte to the point of peripheral vascular collapse. Our attention has been vividly called to this aspect of the problem by post-operative patients, who for one reason or another eat poorly and at the same time continue to lose one or another of the body's fluids in abnormal amounts. We have recently made it a rule that all such patients must be given a regular diet and all diuretic agents discontinued for a few days pre-operatively, in order to permit some elevation of extracellular stores of fluid and electrolyte.

Nausea and vomiting may be produced by acid producing chemicals. These symptoms in our experience are much less prominent than the literature indicates, for, despite the use of these substances in nearly every congestive failure patient which we have treated during the past two years, we can recall only one or two patients who developed nausea and vomiting secondary to their ingestion.

Since the major portion of the ingested acid ions must be eliminated by the kidney, it is clear that reasonably good renal function must be present to allow safe usage of these acid producing substances. The badly diseased kidney eliminates the acid ions more slowly than does the normal kidney. In addition, due to the diminished ammonia forming power of this type kidney, most of the acid ions

which reach the urine are covered with fixed base. The total effect is rapid reduction of the alkali reserve of the extracellular fluid followed shortly by uncompensated acidosis. It is unwise to exclude patients with the lesser degrees of renal impairment from the group suitable for therapy with acid producing substances. As mentioned above, it is precisely that patient in whom some limitation of renal ammonia forming power exists who is forced to eliminate fixed base to cover the acid ion in question. Therefore, diuresis is more marked and longer sustained under the influence of these substances in this type patient than in one with normal renal function. Arbitrarily it would appear that acid producing substances can not safely be used if the carbon dioxide combining power is already thirty volumes per cent or below. In a few such patients we have cautiously tried small doses but clinical improvement has not been noted.

Conversion of ammonia to urea seems to be almost totally a function of the liver[7]. Elevated blood ammonia concentration has been shown to produce convulsions in dogs. In human subjects with cirrhosis of the liver, drowsiness has been attributed to elevated blood ammonia secondary to failure of the diseased liver to convert the ammonia of the ammonium chloride to urea. We have no data bearing directly on this problem, but it would seem wise



to avoid use of ammonia containing acid producing substances in the face of severe liver damage of any type. Hydrochloric acid can be used safely in these patients. The natural question is, why is dilute hydrochloric acid not the acid producing substance of choice in all patients regardless of liver function? The answer resides in three facts. Its taste bothers some patients and the capsules which contain it in combination with an amino acid are too expensive. Further, it requires fifty cc. of dilute hydrochloric acid to introduce the same number of chloride ions as are contained in eight grams of ammonium chloride.

The usual dosage is eight to twelve grams of ammonium chloride in divided doses daily four consecutive days out of each week. This provides 5.3-7.9 grams of chloride ion. The normal kidney can produce ammonia sufficient to cover sixteen grams of chloride daily[7]. This dosage, in conjunction with the diet described below, serves to provide a surplus of acid ions to our patients without any appreciable danger of uncompensated acidosis. For the occasional patient who can not take oral medication, rectal administration of two grams of ammonium chloride in thirty cc. of water four times a day, though less effective than oral therapy, is worth trying. Intravenous administration has been advocated and seems to be relatively safe. We have had no experience with this but it would appear to be worth while in a very occasional patient[8].

One wonders about skeletal decalcification following prolonged use of acid producing substances. It has been shown in animals that combined use of acid producing substances and diets ample in calcium did not lead to skeletal decalcification of significant grade[9]. We have not observed appreciable skeletal decalcification in patients who have taken ammonium chloride daily for as long as two years.

The acid ash diet has recently been repopularized by Schemm[10]. This observer states that within certain limits the diet reaction is more important than its sodium content. In the present state of our knowledge, the sodium ion is the important ion for the edema forming patient to avoid. An acid ash diet contains meats, eggs, cereals, cranberries, plums, and prunes. Excepting cranberries and plums, all of these have a medium to high sodium content. It seems more rational, therefore, to use a basic ash diet containing more fruits and vegetables which in turn are low in sodium (See chart). We have substituted the latter type diet for its low sodium content, and have produced the desired acid ash by use of one of the above acid producing substances. That this principle is sound is attested by the rather prompt improvement which has appeared in a few patients, without otherwise altering their therapeutic programs, when changed from the Schemm type diet to the above type diet containing 1.0 gram of sodium per day. It is possible to reduce the sodium content of meats considerably by cooking in several stages and discarding the cooking waters. This makes the goal too difficult for the average patient. It seems more practical, therefore, simply to reduce the intake of high sodium content meats, eggs, cereals, and prunes.

CONCLUSIONS

1. The intermittent administration of acid producing substances seems to be theoretically and practically more effective for inducing diuresis than their continuous administration.

2. The seeming diuretic synergism between these substances and mercury or xanthines may be related to the combination of two influences, both acting primarily to increase renal sodium elimination.

3. One must pay proper regard to: (a) The relative state of cardiac competency; (b) Renal function; (c) Liver function when ammonium salts are to be used; (d) and, finally, the state of extracellular fluid and its electrolyte content, before using acid producing substances.

4. Nausea and vomiting and skeletal decalcification do not constitute major problems in the use of these substances.

5. A basic ash diet combined with an acid producing substance seems more rational than an acid ash diet in the treatment of congestive heart failure patients since the latter diet is usually of higher sodium content.

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DISCUSSION

DR. R. EARLE GLENDY, Roanoke: The role of acid producing substances and diet in the treatment of congestive heart failure is a very timely subject, and with the increasing use of these measures based upon physiological principles it becomes important to know the method whereby optimal results may be obtained, as well as contraindications to this form of therapy.

The time-honored general measures of rest and digitalis remain the bywords in the treatment of congestive failure but once the heart has failed from progressive cardiac disease, not precipitated by acute myocardial infarction or inflammation, rest and digitalis often become of limited value or entirely inadequate, and we must resort to mercurial diuretics. Long experience with the mercurials has demonstrated their increased effectiveness when administered along with acid producing salts. My own experience has been largely with the continuous administration of ammonium chloride which, with rare exceptions, has been quite satisfactory with very few untoward reactions such as vomiting and abdominal pain. This, along with the periodic injection of a mercurial diuretic and the use of a low sodium diet, strictly adhered to, will be adequate to control the most stubborn case of chronic congestive failure. The practical suggestion offered by Dr. Crutchfield for the intermittent administration of ammonium chloride seems based on sound considerations, and I am sure will be most welcome, particularly to those patients who find it difficult to take.

I most certainly agree with Dr. Crutchfield's conclusions concerning the acid ash diet and believe that it is much easier from a practical viewpoint to attain the desired effect in the kidney through the administration of acid producing salts in conjunction with a low sodium diet of basic ash.

A practical point concerning the use of the low sodium diet is the necessity for explaining the diet in some detail to the patient and anticipating questions concerning it. My experience has been that the most gratifying results are in those patients who adhere strictly to the regimen.

It is at times difficult to be arbitrary about who and who should not be given the mercurial diuretics and acid-producing salts when the question of renal function is raised but it is my impression that they are sometimes denied to patients, on the basis of urinary findings alone, when considerable benefit might be obtained from their use.

DR. PAUL D. CAMP, Richmond: Quite a few years ago, while visiting at the University of Michigan, I was again reminded by Dr. Newburgh of the physiological processes involved in the excretion of ammonia by the kidneys and the advantages of the intermittent administration of ammonium chloride. Since that time I have been using in private practice, as well as at the cardiac clinic at the Medical College of Virginia, this method of administration of ammonium chloride. I do not have any statistics but only my clinical impression. I feel that these patients have benefited quite a bit by that and have done better than on the continuous administration of ammonium chloride. On the days in which the ammonium chloride is not administered, say three or four days out of the week, I take advantage of the opportunity—I believe with good results—to give the patient one of the xanthin derivatives, aminophyllin or whatever else you prefer, on the three days you are not giving ammonium chloride. I believe this helps. As is well known, there is a better diuretic effect when the xanthins are alternated also.

One other point. If these patients have to have a mercurial diuretic, always plan so they will have an injection of the mercurial diuretic on the second day of the administration of the ammonium chloride. That keeps them from getting mixed up and gives better results.

I want to say again that I have enjoyed Dr. Crutchfield's paper.

TIC DOULOUREUX: REVIEW OF 200 CASES TREATED BY SURGERY*

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Medical history reveals that from ancient times a host of people have suffered from attacks of excruciating facial pain, first called tic douloureux by Nicolous André in 1756. The typical nature of the pain has made the diagnosis of this condition exceedingly simple and the surgical treatment has reached a high degree of excellence. In spite of these facts, there are few conditions that are so frequently misdiagnosed or about which so many misconceptions exist as to the results of surgical treatment. The purpose of the present report is to direct attention to the relative ease of diagnosis of tic douloureux and the efficacy of surgical therapy by analyzing a series of cases operated upon in the clinic of the senior author. Over six hundred cases were operated upon in this clinic without a single fatality. The vast majority of these operations were carried out by the senior author and the remainder were done under his direction. Two hundred cases operated upon in one hospital from 1935 to 1945 are used for this analysis as these records are available for study.

DIAGNOSIS

There are naturally many clinical entities other than tic douloureux causing facial pain. Prominent among these are dental caries, sinus disease, neoplasms, atypical facial neuralgia and histamine cephalalgia. The pain of tic douloureux is so characteristic, however, as to permit its easy differentiation from these other conditions in almost every case. The important points in the diagnosis of tic douloureux are the paroxysmal pattern and typical flashing nature of the pain, and the ready production of a painful paroxysm by peripheral stimuli. The pain is never constant and is variously described as being stabbing, shooting, sprangling or like an electric shock. Peripheral stimuli such as talking, shaving, eating or even touching the face lightly will induce painful attacks and the great majority of patients exhibit definite "trigger zones" which are most commonly situated in the upper or lower lip or the side of the nose. Any one or all of the three branches of the fifth nerve may be involved but the lower portion of the face is most frequently affected. The frequency of involvement of the divisions of the fifth nerve in the present series of cases was a follows:

1st division alone— 4 cases	2%
2nd division alone—28 cases	14%
3rd division alone—56 cases	28%
1st and 2nd divisions—12 cases	6%
2nd and 3rd divisions—70 cases	35%
All three divisions—30 cases	15%

Another distinguishing characteristic of tic douloureux is the fact that the pain is unilateral. One of the cases in this analysis had previously been operated upon on the opposite side and the incidence of bilateral involvement is variously reported as 1% by Peet[6], 1.5% by Grant[4], and 5% by Harris[5]. In no recorded cases, however, has the pain occurred simultaneously on the two sides of the face. This fact distinguishes tic douloureux from many of the atypical or psychogenic facial pains. Either side of the face may be involved and here the pain was found to be on the right side in 122 (61%) cases and on the left side in 78 (39%) cases. This greater frequency of right-sided pain has also been reported from other large neurosurgical centers.

The two sexes are approximately equally affected by this painful affliction. In this series there were 116 (58%) females and 84 (42%) males. Although the great preponderance of cases (191-95.5%) were of the white race, the colored race was represented by 9 (4.5%) cases.

Tic douloureux is primarily a disease of the elderly but may occur in early life. The youngest case in this series was 21 years of age and the oldest 87. The age distribution in the 200 cases is shown in the following table:

3rd decade of life	7	3.5%
4th decade of life	16	8%
5th decade of life	30	15%
6th decade of life	49	24.5%
7th decade of life	57	28.5%
8th decade of life	30	15%
9th decade of life	11	5.5%

*Read before the Medical Society of Virginia at its Annual Meeting in Roanoke, October 13-15, 1947.

It is thus obvicus that the vast majority of cases occur after the patients reach 50 years of age. A general impression has been gained that victims of tic pain are usually quite healthy apart from this affliction and their life expectancy is long.

ETIOLOGY

The etiology of tic douloureux remains completely unknown. A variety of theories have been advanced but none of them is completely tenable. Harris[5] strongly advocates the theory of dental sepsis as the etiological agent but this theory hardly accounts for the occurrence of pain many years after patients are completely edentulous. Dandy[3] felt that the sensory root was the seat of pathology in many cases, being impinged upon by tumors or aberrant vessels. The brain stem itself has been indicted because of the occurrence of tic pain in some patients with multiple sclerosis who at post mortem examination are found to have sclerotic plaques involving the sensory nuclei of the fifth nerve. It seems most probable that the flashing pain of tic douloureux is a symptom that may be explosively manifested by factors affecting any part of the fifth nerve from its peripheral branches to its central connections.

TREATMENT

The method of choice in the treatment of tic douloureux is the surgical section of the sensory root of the fifth nerve. Alcohol injection of the second or third divisions has been a frequently used method of treatment but is now reserved for atypical cases, for those patients who insist upon nonsurgical treatment, and the very rare patient who seems physically unable to undergo surgery. It has become increasingly evident that it is extremely rare to find a patient who is not physically able to undergo this type of surgery. In fact, Bucy[2] has stated that all patients can be given the benefit of operative relief of their pain. Sixty-two per cent of the cases here reported had previously been injected with relief lasting in different individuals from a few days to nine years. Medical treatment with vitamin B_1, liver extract, histamine or ferrous carbonate are mentioned only in condemnation. It seems now to be firmly established that no medicinal treatment is of the slightest value in the cure of tic douloureux. During an acute exacerbation of pain, complete quiet and the administration of phenobarbital will reduce the number of paroxysms but such treatment is, of course, only temporary.

The subtemporal approach to the sensory root was utilized in all of the cases. This method has been reported many times previously and will be only briefly outlined here. A straight incision about 6 cm. in length is made in the temporal region in the direction of the fibers of the temporal muscle. The fascia and muscle are split down to the zygomatic arch and an opening approximately 3 cm. in diameter is made in the temporal bone. The dura is then carefully elevated from the floor of the middle fossa until the foramen spinosum is reached. This foramen is plugged with cotton to control bleeding from the middle meningeal artery which is then divided. The foramen ovale is then exposed by elevating the dura anterior and medial to the foramen spinosum. The dura is elevated from the third division of the nerve and dissected away from the Gasserian ganglion. Dissection is continued back until the dura propria over the sensory and motor roots is exposed. This sheath is incised and the sensory root avulsed. It is often possible to preserve the motor root and, in indicated cases, a selective section of the sensory root can be carried out. In the present series, a partial section of this root was performed in 64 per cent of the cases.

The operation is performed with the patient in the sitting position, the head being firmly supported. Local anesthesia is used almost exclusively but is frequently supplemented with sodium pentothal during the actual section of the root.

Other surgical approaches for the relief of facial pain, such as the occipital approach of Dandy[3], the cauterization of the ganglion of Kirschner and the tractotomy of Sjoquist[7] have been proposed. It is the firm belief of the authors that the subtemporal operation above outlined is the safest and best method for the relief of the distressing pain of tic douloureux. In the hands of experienced operators the method has an extremely high degree of safety. It is also possible in the majority of cases to perform a selective section of the sensory root and thus preserve sensation to the cornea.

RESULTS

As mentioned at the beginning of this report, there are few procedures about which more misconceptions exist than concerning the results of the surgical treatment of tic douloureux. The mortality rate from all of the major neurosurgical centers is reported as being one per cent or less. In over 600

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cases operated upon by the senior author and his associates, there was not a single death. There are few, if any, surgical procedures of any type that are performed with similar records.

The most widely held erroneous belief concerning the results of the surgical treatment of tic douloureux regards the incidence of facial paralysis. Certainly the source of some of this misconception is the understandable lay belief that cutting a nerve supplying sensation to the face will necessarily paralyze the face. The erroneous ideas, however, extend to the medical profession. The facts refute the idea that facial paralysis is a major complication in the treatment of facial pain. Grant and Peet report an incidence of paralysis of 3.4% and 4%, respectively. In the present series of cases the incidence was 4%. In every case the paralysis was temporary and usually completely disappeared within a few weeks.

Keratitis occurred in 7% of the cases here reported. In all instances these cases had total section of the sensory roots. Although annoying, the keratitis is rarely of serious import. Patients with an anesthetic cornea are warned about the proper care of the eye. Rarely it is necessary to temporarily suture the lids but this is a small price to pay for relief from the excruciating pain of tic douloureux. In no instance in this series has the keratitis failed to respond to proper treatment.

Paresthesias in the portion of the face rendered anesthetic by operation occurred in 6% of these cases. The incidence of these burning or crawling sensations has been variously reported as being from five to sixteen per cent. In the vast majority of cases the paresthesias are of minor nature and eventually disappear.

From a review of the relatively rare complications following the surgical treatment of tic douloureux it seems obvious that this is one of the most successful procedures in any type of surgical practice.

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Floral Eponym.

MERATIA

MÉRAT, FRANCOIS VICTOR, 1780-1851

Mérat, a pupil of Corvisart, was *chef de clinique de la Faculté de Médecine de Paris.* He is best known medically as the author of a collection of little dicta which have been called the "Aphorisms of Corvisart".

Meratia is a genus of Chinese deciduous or evergreen shrubs of the family Calycanthaceae. M. Praecox is noted for its fragrance. It blooms nearly all the winter in the South as far North as Richmond.

STREPTOMYCIN IN THE TREATMENT OF DRAINING TUBERCULOUS SINUSES*

WALTER L. NALLS, M.D.,
and
RALPH E. MOYER, M.D.,
Oteen, North Carolina.

The use of streptomycin in the treatment of human tuberculosis has received considerable attention recently. At present an extensive study of this subject is in progress in various Veterans Administration Hospitals. It has been demonstrated that one of the most impressive results in the treatment of tuberculosis in man has been attained following the use of this drug in draining tuberculous sinuses.

Streptomycin was made available for this study at this hospital in July, 1946. The original report by Brock[1] included 12 cases in which treatment was started on nine in July, and on three in September, 1946. Since that time we have had the opportunity to observe the effect of streptomycin therapy in an additional 30 patients with draining tuberculous sinuses. The purpose of this communication is to review the results in this group of patients some of whom were treated on a reduced dosage regimen. Our experience substantiates the previously reported excellent results.

Under the old regimen, 1.8 gm. of streptomycin was given intramuscularly daily in six doses of 0.3 gm. A total of 23 cases was treated on this schedule. The results were gratifying, and since certain toxic manifestations were regularly observed, it was decided to reduce the dose of the drug in June, 1947. Since that time an additional 19 cases have been treated. On the new regimen these latter patients have received 0.2 gm. intramuscularly every four hours for five doses, or a total daily dose of 1.0 gm.

Of the original group of 23 cases treated with the larger dosage, 19 were negro and four were white. In 15 of these the draining sinuses originated in bone or cartilage. Three were from tuberculous glands and two developed after removal of a tuberculous epididymis. In one patient a sinus developed following laparotomy for a tuberculous appendix and another had several perineal sinuses in the ischiorectal area. One patient had a sinus following a pericardectomy for a purulent tuberculous pericarditis. Of the 19 patients treated with 1.0 gm. of streptomycin daily, 11 were white and eight were negro. In seven the sinuses originated about the rectum; six were from bone (or cartilage), four followed epididymectomy, and two were in the chest wall following thoracoplasty.

In many instances multiple sinuses were present, and some patients had sinuses in several areas. Of the 42 patients treated under both regimens, a total of 250 draining sinuses was observed. All of these were of proved tuberculous etiology, either by culture of material from the sinus tract or by biopsy of the wall of the sinus.

TOXICITY AND MANAGEMENT

Local pain at the site of injection may become bothersome. Rotation of the points of injection is advisable, and the upper and outer quadrants of the buttocks have proved to be the best site for the injections.

Two reactions may necessitate the cessation of streptomycin treatment after appropriate investigation—onset of loss of hearing as evidenced by a reduction in audiometric readings; kidney damage which may progress and produce irreversible changes. Whenever the presence of albumin, granular or hyaline casts or increased numbers of red and white blood cells in the urine are noted, continuation of therapy is possible, but frequent repetition of function tests, assay of blood concentrations and urinalyses are in order. Streptomycin should be discontinued whenever an appreciable loss of kidney function, an elevation of blood urea nitrogen or retention of streptomycin (above 50 micrograms/cc.) in the blood serum are observed.

Two rare complications necessitate the immediate cessation of streptomycin treatment. Exfoliative dermatitis with or without anaphylactic shock and fever may occur, usually within the first month. Bone marrow depression may occur as evidenced by

*From the Department of Medicine and Surgery, Veterans Administration, Oteen, North Carolina. Published with permission of the Chief Medical Officer, Department of Medicine and Surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the authors.

a reduction in peripheral circulating granulocytes, particularly stab forms, erythrocytes or platelets.

Two complications—vertigo and eosinophilia—do not require cessation of treatment but do demand careful clinical and laboratory observation. Eosinophilia with or without cutaneous eruption will occur. The eosinophilia may reach a level of 25 per cent and in itself is unimportant. A maculopapular rash may appear for short periods of time. If the rash is pruritic, 50 mgms. of benadryl, one to four times daily, will control the symptoms.

Under the old regimen of 1.8 gm. daily, an eosinophilia of more than 5 per cent occurred in a number of cases, usually after the first week of therapy, and persisted for periods ranging from a few days to several weeks. Varying numbers of hyaline casts appeared in the urine of all patients at some time during treatment. Repeated blood urea nitrogen determinations and urea clearance tests remained normal during and after the period of treatment in all cases. Likewise, no indication of liver damage was encountered.

The most common toxic manifestation noted under the old regimen resulted from damage to the vestibular apparatus. A syndrome characterized by dizziness, ataxia and blurred vision occurred often in the fourth week of treatment. These symptoms varied in severity from an occasional mild sensation of dizziness to a severe vertigo associated with all movements. In the latter case a temporary though definite incapacity resulted. A modification of the Barany caloric stimulation procedure was employed to evaluate vestibular function, and in all cases a definite diminution in the response of the internal ear to caloric stimulation was noted. In a few instances the hypo-irritable labyrinth progressed to a dead labyrinth. It was not considered an indication for discontinuance of therapy, however, and in most cases the symptoms as experienced by the patient lessened and in time disappeared. Presumably the individual employed his visual and proprioceptive senses to compensate for this diminution in labyrinthine function, but some difficulty in locomotion in the dark persisted. Just how serious a disability this will impose upon the individual upon his return to life outside the hospital is the subject of much discussion and conjecture. It has not proved important to his adjustment in the hos-

TUBERCULOUS SINUS CASES OLD REGIMEN 1.8 GRAMS DAILY

SOURCE OF SINUS	NUMBER CASES		NUMBER OPERATED OR I AND D	LENGTH OF TREATMENT	NUMBER HEALED	NUMBER IMPROVED	NUMBER UNCHANGED
	WHITE	COLORED					
Bone	1	14	12	3 to 8 mo.	14		1
Rectum		1	1	3 mo.	1		
Epididymis	2		2	3 mo.	2		
Glandular		3	1	3 mo.	2		1
Abdomen (P. O.)	1		1	3 mo.	1		
Heart Tbc. Pericarditis		1	1	3 mo.	1		
Total	23		18	3 to 8 mo.	21		2

TUBERCULOUS SINUS CASES NEW REGIMEN ONE GRAM DAILY

SOURCE OF SINUS	NUMBER CASES		NUMBER OPERATED OR I AND D	LENGTH OF TREATMENT	NUMBER HEALED	NUMBER IMPROVED	NUMBER UNCHANGED
	WHITE	COLORED					
Bone	1	5	6	6 wk. to 3 mo.	3	3	
Rectum	5	2	5	2 to 3 mo.	5	2	
Epididymis	4		3	2 to 3 mo.	3	1	
Chest—Empyema and Thoracoplasty	1	1	2	1 mo.		2	
Total	19		16	1 to 3 mo.	11	8	

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pital, but it seems that it might contraindicate certain occupations. Development of deafness was not observed in any case.

Under the new regimen of 1.0 gm. daily, toxic manifestations in general were fewer and much less severe. A mild degree of eosinophilia occurred late in several cases. The presence of casts and albumin in the urine was not observed in any instance. A mild vertigo occurred in a few cases but in some of these this symptom was questionable. In three cases, however, there was objective evidence of some involvement of the vestibular apparatus. These patients developed some hypo-irritability of the labyrinth upon caloric stimulation studies. In one case treatment was discontinued because of an exfoliative dermatitis which developed during the sixth week of treatment. This gradually cleared under treatment with benadryl.

RESULTS

The rapid subjective improvement in practically all patients in the series was noteworthy. The appetite uniformly improved and many remarked upon a returned sense of well-being. Concomitant with this an increase in weight was noted in the majority of cases, averaging 15 pounds. One patient's weight increased 48 pounds during the period of treatment. Elevated temperatures promptly returned to normal and remained so.

We have been impressed by the fact that closure of the sinus is more prompt when free drainage is present. If small abscesses exist beneath the skin and the sinus is not draining adequately, the area should be incised and the pus evacuated. Large cold abscesses existing in conjunction with tuberculosis of the vertebrae should be incised and drained. Necrotic bone or cartilage, as in rib or sternum, should be removed and adequate drainage established. These procedures should be completed before instituting streptomycin therapy.

The promptness of the healing following initiation of treatment is one of the outstanding findings in this series. Within three or four days of treatment the purulent material draining from the sinuses became smaller in amount and less purulent. Many sinuses of several years' duration began to close within a week or ten days.

Under the old regimen, 23 patients were treated and 18 were operated upon or had incision and drainage before therapy with streptomycin. The average duration of treatment in this group was three months. In one case treatment was continued for eight months and in one, for five months before closure of all sinuses occurred. Twenty-one patients have had closure of all their sinuses, and sinuses have remained closed following termination of therapy for an observation period of from seven to 12 months. Two cases were listed as unchanged under therapy. One patient had three draining sinuses, two of which closed and one remained open. This patient had a progressive pulmonary lesion and died several months after the institution of streptomycin therapy. The other patient was a negro girl with sinuses originating from tuberculous cervical lymph glands. Treatment should have been continued, but the patient refused because of pain experienced at the site of the injections.

A typical example of the excellent results attained with streptomycin is that of a young negro (E. S.) who had a total of 28 draining sinuses. Multiple sinuses originated from ribs and cartilage, left radius, both tibiae and both scapulae. All sinuses closed and healed except one on the anterior chest wall. Following removal of the right anterior sixth rib and cartilage, the sinus closed and all sinuses since that procedure have remained closed and healed. This patient made a remarkable recovery, gaining 48 pounds in weight.

Under the new regimen, 19 patients were treated and 16 of these were operated upon or had incision and drainage before institution of the streptomycin therapy. Seven were started on streptomycin treatment in June, 1947, four in July, six in August, and one in September. The average length of time of treatment in this series to date is one to three months. Eleven cases show complete closure of all sinuses. Eight patients are listed as improved with all sinuses rapidly closing. One patient developed an exfoliative dermatitis after six weeks and treatment was discontinued. Drainage had ceased after two weeks and the sinus was closing rapidly. This is the only case in the entire series requiring discontinuance of treatment due to toxicity from the streptomycin.

SUMMARY

Streptomycin has produced dramatic results in the treatment and healing of draining tuberculous sinuses. Twenty-three patients were treated under the old regimen. Twenty-one have had complete

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closure of all their sinuses, and they have remained closed following termination of therapy for an observation period of from seven to 12 months.

Nineteen patients have been treated or are under treatment with the new regimen. Eleven have had complete closure of all their sinuses and in eight the sinuses are rapidly closing.

One of the major problems in this study was the determination of the correct dosage. With the reduced dosage under the new regimen, the same results are being attained with a marked reduction or complete absence of the toxicity noted under the old regimen. Recent sensitivity studies have revealed that under the reduced dosage, resistance of the tubercle bacilli to streptomycin does not develop as often or as quickly as under the old regimen. It has also been determined that under the reduced dosage, treatment given twice daily which secures a higher streptomycin blood level peak, produces less resistance than the more frequent treatment of five injections daily with a smaller streptomycin blood level peak. With this information, the treatment routine advised at present is one gram daily, 0.5 gm. twice daily, 12 hours apart, intramuscularly; duration of treatment for 30 days after healing has taken place or for a total of 120 days, whichever is shorter.

It is expected that under this regimen resistance will be reduced, toxicity markedly delayed, diminished or eliminated and the same excellent results attained.

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New Books.

Among the new books recently acquired by the Library of the Medical College of Virginia are the following which may be borrowed by our readers under usual library rules:

Bailey—Demonstrations of physical signs in clinical surgery.
Bancroft—Surgical treatment of the soft tissues.
Barach—Physical therapy in respiratory diseases.
Beckman—Treatment in general practice. 6th ed.
Brunschwig—Radical surgery in advanced abdominal cancer.
Buckstein—The digestive tract in roentgenology.
Christopher—Minor surgery. 6th ed.
Ciba Pharm. Co.—Male hormone therapy.
Clarke, *et al.*—The use of isotopes in biology and medicine.
Cox—Atlas of practical incisions and some operative procedures.
Crossen—Operative gynecology. 6th ed.
Dandy—Surgery of the brain.
Dunbar—Emotions and bodily changes. 3rd ed.
Edwards—Synopsis of general anatomy.
Foot—Identification of tumors.
Goldberger—Unipolar lead in electrocardiography.
Hinshaw—Take up thy bed and walk.
Hoff—A bibliographical sourcebook of compressed air, diving and submarine medicine.
Hooten—Up from the ape.
McBride—Disability evaluation. 4th ed.
Novak—Textbook of gynecology. 3rd ed
Novak—The woman asks the doctor.
Noyes—Modern clinical psychiatry. 3rd ed.
Purves-Stewart—The diagnosis of nervous diseases. 9th ed.
Roberts—Chronic structural low backache due to lowback structural derangement.
Symposium in the use of isotopes in biology and medicine.
Todd and Sanford—Clinical laboratory diagnosis. 11th ed.
Walton—Control of pain with saddle back and higher spinal anesthesia.
Winton and Bayliss—Human physiology. 3rd ed.
Wolberg—Hypnoanalysis.
Wolf—Ear, nose and throat.
Wolff—Anatomy of the eye and orbit.
Wolff—Headache and other head pain.
Zahorsky—Synopsis of pediatrics.

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THE CLINICAL SIGNIFICANCE OF THE RH FACTOR*

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Richmond, Virginia.

The Rh factor is not a disease or the "Blood that kills", as many of the laity have been led to believe. It is an antigen normally found in the red blood cells of 85 per cent of the random white population, similar to the A and B factors which make up the four main groups of the international blood group classification with which you are already familiar.

Our greatest problem with the Rh factor recently has been in alleviating unwarranted fears in patients caused by articles in lay magazines. It is most important for every physician to understand the significance of the Rh factor so that he may dispel the patient's fears and at the same time protect her against disaster which may be caused by Rh incompatibilities.

Rh factor is an *antigen* or *agglutinogen,* just as the A and B factor, and is found in the red blood cells. When the patient's red cells contain the factor, the patient is Rh positive. If the red cells do not have the factor, the patient is Rh negative.

The *antibodies* or *agglutinins* built up against these antigens are in the serum.

When the blood of a donor whose red cells contain the agglutinogen, Rh factor, is mixed with blood of a patient whose plasma contains a specific antibody or agglutinin for the Rh factor, a demonstrable reaction, agglutination of the donor's red cells, is produced. Under two conditions plasma will develop anti-Rh agglutinins or Rh antibodies:

1. Following repeated transfusions of blood from Rh positive donors into Rh negative recipients, or
2. In some pregnancies where the mother is Rh negative and the father Rh positive, the mechanism of these reactions is illustrated as follows:

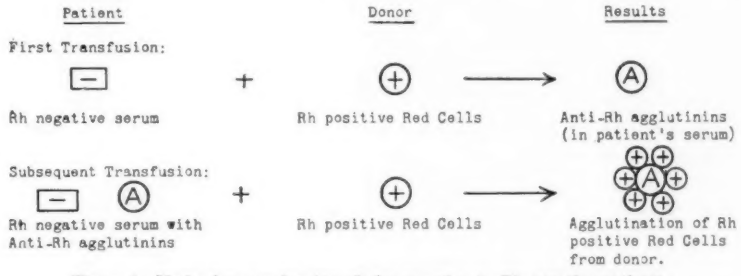

Figure 1. Mechanism causing transfusion reaction in Rh negative patients.

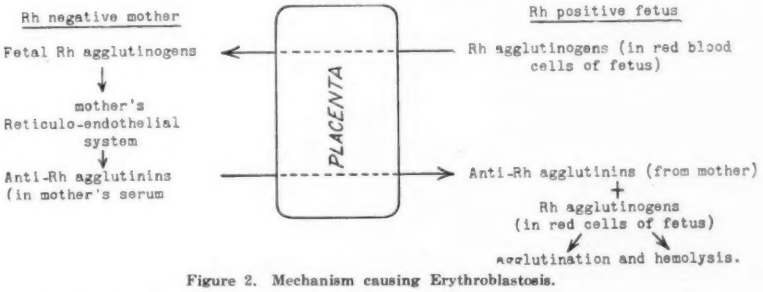

Figure 2. Mechanism causing Erythroblastosis.

(The two slides† illustrate mechanism of reaction.)

When the mother is Rh negative and the father Rh positive, the baby is affected by the incompatibility only approximately one in fifty cases. The baby is affected with that frequency, not with first or second, but usually third or fourth pregnancy, or later. The low incidence of erythroblastosis is explained by the following factors:

*Read before the Medical Society of Virginia at its annual meeting in Roanoke, October 14, 1947.

†Diagrams from article in Lahey Clinic Bulletin, March, 1944. "Significance of the Rh Factor" by Dr. Jno. W. Norcross, Boston, Mass.

1. Only 15% of population is Rh negative.
2. Husband may also be Rh negative.
3. Husband may be heterozygous.
4. Women vary in ability to produce antibodies, as in infectious disease.

If the patient who is Rh negative is inadvertently given a transfusion with Rh positive blood earlier in life, however, she may be sensitized to the Rh factor by the transfusion. With the Rh antibodies present at the onset of her first pregnancy, her chances of having any living healthy children may be endangered.

By the same token, an Rh negative patient may be sensitized to the Rh factor by pregnancies. Then at some later date, months or years later, when she is inadvertently given a transfusion with Rh positive blood, she may get a severe or even fatal reaction from the first transfusion.

Routine Rh studies done during the prenatal period are as follows:

1. Rh type all prenatals on first visit.
2. If patient is Rh negative, Rh type husband.
3. If husband is Rh positive and patient Rh negative, examine patient's serum for Rh antibodies 3 or 4 weeks prior to term.
4. If antibodies are present, check the titre at later date to guide prognosis and treatment for baby.

In conclusion, *it is important* that:

1. No girl or woman should be transfused, regardless of age or indication, without having Rh typing done.
2. All Rh negative patients should be transfused with only Rh negative blood.
3. If a patient, being transfused without Rh typing, should have a chill, or jaundice, carry out Rh tests before another transfusion is given.
4. Hospitals and blood banks should either store Rh negative blood or have a list of normal Rh negative donors available for emergencies.
5. All prenatals should have Rh typing done as a routine procedure when possible.
6. When prenatal patients are Rh negative, blood should be checked during the last trimester for presence of anti-Rh agglutinins.
7. In transfusion of erythroblastotic infants, Rh negative blood should be used.
8. Because experience has shown that there is a fall in titre of anti-Rh agglutinins with the lapse of time, Rh negative mothers should be cautioned against pregnancies in rapid succession.
9. An Rh negative mother should be warned of the dangers of subsequent transfusions by donors who have not been proved Rh negative.
10. Present knowledge indicates that abortions are not due to Rh incompatibilities.
11. Rh negative patient with Rh positive husband can have normal pregnancies.
12. Rh positive transfusion to Rh negative girl jeopardizes her future pregnancies.
13. Knowledge and practical application of information about Rh factor is of vital importance, not only to obstetrician and pediatrician, but to all who practice medicine and use blood transfusions.

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NOTE.—Discussed with Dr. Kendig's paper which follows.

HEMOLYTIC ANEMIA IN THE NEWBORN*

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Richmond, Virginia.

During the past few years much has been written about the Rh factor. The literature accumulated dealing with one of its chief related problems, i.e., hemolytic anemia in the newborn, has come almost entirely from large hospital newborn services. Little has been written about the problem as it occurs in private practice.

The following 32 cases were all private patients. Of these, 29 were of the usual setup, with the father Rh positive, the mother Rh negative and the baby Rh positive. One case was the so-called Rh_z and 2 cases were of undetermined origin, even though thoroughly studied from the standpoint of the Rh factor, group incompatibility, etc. They belong in that group described by Broman[1].

History of the mother's previous pregnancies, the demonstration of circulating antibodies in the mother's blood, and the appearance of jaundice during the newborn period were useful in the diagnosis, but it must be stated that the excellent prenatal care by obstetricians, who often knew of impending trouble, was most helpful. The presence of erythroblasts in the infants blood smear did not prove to be of great help in this series, in that some of the most severe cases did not originally show an abnormal number of erythroblasts.

Briefly, among the 29 Rh negative mothers of children with hemolytic anemia, 27 had a history of previous pregnancies, and 10 of these had more than one pregnancy. Included in these previous pregnancies were 5 stillbirths and 7 infants who died during the neonatal period.

Anti-Rh agglutinins or blocking antibodies were demonstrated in the mother's blood in 21 instances. In 4 cases no test was made, but these, as well as those 4 cases in which no antibodies were demonstrated, were instances of the usual Rh setup with rather marked blood destruction in the baby.

It should be noted that antibody titers in the mother, while helpful, are misleading, and are not to be interpreted as being necessarily indicative of the severity of the erythroblastosis in the infant.

As expected, there were all gradations of severity. There were 2 deaths and one of these was one of twins. The other twin was a hydrops, and this one, jaundiced deeply and weighing only 4½ pounds, lived about 14 hours. This baby received one transfusion of Rh negative blood to no avail. It is interesting to note that no anti-Rh antibodies could be demonstrated in the mother's blood as late as one week prior to delivery. Later re-check showed the presence of blocking antibodies.

The other death occurred in an erythroblastotic newborn who was apparently progressing nicely. The mother had 3 previous pregnancies and there was one living child. This baby was transfused immediately after delivery and the next day the red blood cell count was 3,500,000. The baby was transfused again. On the next day (third day of life) the red blood cell count was 4,500,000, and the baby appeared to be in good condition. About 18 hours later the child vomited 15 cc. bright red blood, and died a few hours thereafter.

On follow-up, the one living case of kernicterus is both mentally and physically retarded. This child was first seen at 5 days of age with marked jaundice and red blood cells 1,800,000. He was given 7 transfusions of Rh negative blood. Since kernicterus is not considered to be related to the degree of anemia, it is doubtful whether earlier transfusion would have given a better result.

The management of hemolytic anemia in the newborn is ever-changing. Multiple transfusions of Rh negative blood still constitute the most widely accepted therapy. Potter[2] suggests that after the first week of life, transfusions may be withheld until the red blood cell count is about 2,500,000, but this criterion is not a safe one during the first week. Mayes[3] has suggested that every baby, whose mother has been demonstrated to have anti-Rh agglutinins in her blood, should be given a transfusion of Rh negative blood into the umbilical vein at birth.

Diamond[4] and others recommend the so-called exsanguination transfusion, and he (Diamond) feels that its use has definitely lowered the mortality in his series.

Our course has varied with the trend. Whenever the mother has already had an erythroblastic baby or has anti-Rh agglutinins demonstrated in her blood prior to delivery, we are prepared to transfuse immediately after delivery. Whenever

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*Read before the Medical Society of Virginia at its Annual Meeting in Roanoke, October 14, 1947.

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laboratory studies show that blood destruction begins to occur in any of these Rh positive babies of Rh negative mothers, an initial transfusion of Rh negative blood is given. We then wait to see if the destruction will be great enough to warrant further blood replacement and govern our course accordingly, using 3,000,000 red blood cells as an elastic base line after the first week.

Three babies in this series received a cord vein transfusion at delivery. Another was attempted, but was not successful and the blood was given into a scalp vein. One of these transfused via the cord vein was the first-born of an Rh negative mother who had been transfused on 2 previous occasions, and had anti-Rh agglutinins demonstrated in her blood a few weeks before term. Cord blood from the baby showed anti-Rh agglutinins in a titer of 1 to 16, but the child progressed normally and required no more transfusions.

SUMMARY

Thirty-two cases of hemolytic anemia in the newborn are reported. The diagnosis and management are discussed.

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414 West Franklin Street.

DISCUSSION OF PAPERS BY DRS. WINN AND KENDIG

DR. J. H. SCHERER, Richmond: Drs. Winn and Kendig have so completely covered the clinical aspects of erythroblastosis or congenital anemia that I am left with very little to discuss. As Dr. Winn brought out, more than one in thirty women are sensitized by pregnancy. Not yet completely understood is the fact that transfusion of blood from a Rh-positive donor sensitizes approximately one in two negative individuals. One sees the enormous importance of bringing to medicine and surgery and obstetrics the fact that all women and all children must be typed for the Rh factor and given only Rh-negative blood. More and more frequently we are seeing even a first-born denied a woman because of a transfusion given her ten, fifteen, twenty or more years before. It is fundamental that we try never to give an Rh-negative individual Rh-positive blood, particularly in the case of female infants and females in the child bearing age.

We think that all pregnant women should be tested at their first visit, and if there is a history of transfusion or abortion or previous pregnancy, they should be titred at their first visit to see at that point what is being carried over from past events. Then, as Dr. Winn pointed out, they should be titred from the seventh month on to watch the progress of the present pregnancy, and steps should be taken to treat according to the antibody titre. Unfortunately, up to the present time antibody titrations have not meant a great deal because there is a vast difference in technique. For instance, laboratories using plasma or bovine albumin or using serum will each get different results. Fortunately, there is now being offered a program which will standardize these titrations, and from now on you should be able to tell something from the results of titration.

Next, I want to point out that Rh-negative donors are potentially dangerous. I think every hospital chart should have printed on it, as the first question: Have you ever had a transfusion? Any Rh-negative donor who has previously had any transfusion or pregnancy could be a dangerous donor for an erythroblastotic child or for an Rh-positive individual. We should therefore ask this question and never use an Rh-negative donor with anti-Rh antibodies for an erythroblastotic child or an Rh-positive individual.

MR. ROBERT WALLER, Richmond: During the very interesting papers of Dr. Winn and Dr. Kendig I have made a few notes which may be of interest to you. Firstly, I should like to point out that even abortions may start immunization in women, that is, even early abortions.

Recently we have taken ten Rh-negative male volunteers at the penitentiary, and injected them intravenously with Rh-positive blood. Four of these men have shown the presence of antibodies after a single injection despite the fact that none had received previously blood in any form. After multiple injections eight out of ten produced antibodies. The total amount of blood injected did not exceed five cc.

Drs. Winn and Kendig mentioned to you agglutinins and blocking antibodies. In addition, British authors some time ago described a third method of demonstrating the presence of antibodies by means of an anti-human precipitin serum. I think that this method will not only demonstrate all antibodies present, but also their full extent.

Occasionally you will run into a case in which you cannot demonstrate either agglutinins or blocking antibodies, but will be able to demonstrate sensitization by means of the precipitin technique. I think you should therefore require that this technique be used by the laboratory you deal with, in addition to the other methods for demonstrating Rh sensitizations.

Secondly, I think that all pregnant women should be tested at the very beginning of their pregnancy and not solely during the last trimester, as is done so frequently.

Thirdly, I would like to point out that the precipitin technique may prove to be very valuable in determining whether or not an erythroblastotic infant will need additional transfusions, because as long as any antibodies are attached to the baby's cells the precipitin reaction will be positive and further hemolysis can be expected.

XUM

SULFADIAZINE IN THE TREATMENT OF MENINGOCOCCIC MENINGITIS: A STUDY OF SIXTY CASES WITHOUT A DEATH

SIDNEY G. PAGE, JR., M.D.,
and
M. JANE PAGE, M.D.,
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Many authors report that sulfadiazine is the drug of choice in the treatment of meningococcic meningitis[1-11], and streptococcic meningitis[12], while penicillin is conceded to be superior in the treatment of staphylococcal and pneumococcal meningitis[12]. Sulfadiazine is also employed in the meningococcic meningitis[13] and its carrier states[14].

Meads *et al.*[15] found sulfadiazine superior to penicillin in several respects; clinical response to penicillin is slower than that to the sulfonamides; abnormal spinal fluid, chemical and bacteriological findings persist longer; there may be recurrences; the meningococcus-carrier state may persist; the treatment is difficult, and, finally, one may eventually have to resort to the sulfonamides for cure.

Another disadvantage of penicillin, when used intrathecally, is its effect in producing pleocytosis[16-17] of the spinal fluid, thus making difficult the evaluation of the therapeutic effect of the penicillin. However, as greater purity of the pencillin has been attained, the reaction of pleocytosis has been noted less frequently.

Other complications resulting from the intrathecal, intracisternal and intraventricular administration of penicillin have been reported[18] which include adhesive spinal arachnoiditis and transverse myelopathies. It is only fair to point out, however, that in the majority of the cases showing these complications relatively concentrated solutions (5,000 to 50,000 units per cubic centimeter)[18-19] were used instead of dilutions of 1,000 units per cubic centimeter or less, as recommended by the committee of the National Research Council.

The important factors in the production of toxic complications by the intrathecal use of pencillin are:

1. Concentration of penicillin solution.
2. Slow diffusion of spinal fluid.
3. Size of individual doses.
4. Frequency of injection.
5. Duration of intraspinal therapy.

Thus, the occurrence of these complications may be minimized by using a dilute solution of penicillin, avoiding the use of a large total dosage, and by limiting the number of injections to a minimum.

The following report of 60 consecutive cases of meningitis admitted to a Station Hospital between December 23, 1942, and June 14, 1945, is offered as additional evidence of the efficacy of sulfadiazine in the treatment of this disease. Forty-eight cases (80%) were proven to be meningococcic by either smear or culture of the spinal fluid, or by blood culture. Twelve cases (20%), while not proven bacteriologically, did fulfill clinical criteria of headache, nuchal rigidity, vomiting, fever, and pleocytosis of the spinal fluid. Five cases were considered mild, 28 of moderate severity, while 27 were severe (14 of which were admitted to the hospital in coma).

There were 43 white and 17 colored in the series with an average age of 26 years. Fifty-nine were males and one was a female. Fifty-eight were soldiers and two were civilians.

Epidemiology. The cases in this series were endemic (see Chart I), seven being the largest number occurring in any single thirty-day period (April, 1943). The seasonal variation is evident (39 or 65% of the 60 cases occurring during the months of January, February, March, and April).

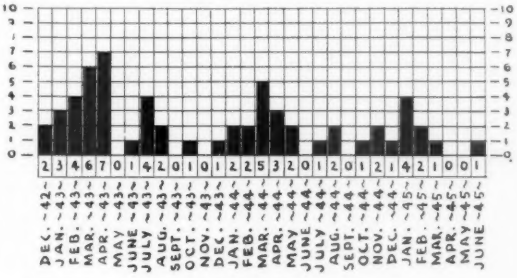


CHART I

No data are available concerning the predisposing factors of over-crowding in barracks or fatigue, but the average service in months was 14, although 32 (55%) of the soldiers had 6 months or less Army service.

Signs and Symptoms on Admission. The admission temperatures averaged 99.6°, with highest of 104° and lowest of 98.4°.

Although only 53 of the cases had fever on admission, all cases had temperature elevations at some time during their hospital stay.

Admission pulse rates averaged 97.2 per minute, with the highest 148 and lowest 68.

Admission respiratory rates averaged 23.2, with highest of 44 and lowest of 18. The tendency toward tachypnea noted in this series (36 out of 60 cases with admission respiratory rates above 20 per min.) is in agreement with Denny *et al.*,[3] who found an increased respiratory rate out of proportion to the temperature elevation in 53 of his 61 cases.

Chart II lists the signs and symptoms noted on admission, in order of their frequency. Nuchal rigidity was noted in 88% of the cases. Eighty-seven per cent complained of severe headache, while 65% demonstrated a positive Kernig's sign. Chills were noted in 60% and vomiting in 53%.

CHART II

SIGNS AND SYMPTOMS ON ADMISSION

Fever	88%	(53 out of 60 cases)
Nuchal Rigidity	88%	(53 out of 60 cases)
Headache	87%	(52 out of 60 cases)
Kernig	65%	(39 out of 60 cases)
Chills	60%	(36 out of 60 cases)
Vomiting	53%	(32 out of 60 cases)
Petechial Rash	43%	(26 out of 60 cases)
Myalgia	42%	(25 out of 60 cases)
Brudzinski	30%	(18 out of 60 cases)
Malaise	25%	(15 out of 60 cases)
Nausea	25%	(15 out of 60 cases)
Coma	23%	(14 out of 60 cases)
Preceding Upper Respiratory Infection	20%	(12 out of 60 cases)
Sore Throat	18%	(11 out of 60 cases)
Arthralgia	17%	(10 out of 60 cases)
Drowsiness	15%	(9 out of 60 cases)
Babinski	10%	(6 out of 60 cases)
Weakness	10%	(6 out of 60 cases)
Restlessness	8%	(5 out of 60 cases)
Confusion	7%	(4 out of 60 cases)
Delirium	7%	(4 out of 60 cases)
Lethargy	7%	(4 out of 60 cases)

Laboratory Data. Possible sources of diagnostic assistance include specimens for culture from the nasopharynx, blood, and spinal fluid. Petechial smear and culture, as well as direct blood examination for organisms are also valuable.

Bacteriologic study in this series did not include nasopharyngeal cultures on admission, but in some cases they were performed at completion of therapy. Since Tompkins[20], as well as McLean and Caffey[21], obtained positive petechial smears in 80% of meningococcemia cases, it would seem that this procedure should be included as routine in each suspected case. We, like many others, were not appreciative of the tremendous value of the stained smear and culture of blood from the purpuric lesions of meningococcic septicemia until rather late in our series, and thus petechial smears were studied in only three cases with negative results.

Observations of the character of the spinal fluid in 36 cases on admission revealed cloudy appearance in 31, while 5 were clear. The average spinal fluid W.B.C. was 5,498, the highest being 27,000 and lowest zero. In several instances clear spinal fluid with low white blood cell counts were noted at the time of the initial lumbar puncture, but spinal fluid obtained 6-8 hours later was found to be cloudy with marked pleocytosis in spite of the institution of intravenous sulfadiazine at the time of the initial lumbar puncture.

In nine instances positive cultures of the spinal fluid were obtained when the spinal fluid smears

48 CASES OF MENINGOCOCCIC MENINGITIS

NUMBER OF CASES	8	2	3	15	3	1	1	4	2	5	1	1	1	1
SPINAL FLUID CULTURE	+	+	+	+	-	+	-	+	-	+	+	+	O	-
BLOOD CULTURE	+	+	-	-	-	+	+	O	+	-	O	O	-	+
SPINAL FLUID SMEAR	+	-	-	+	+	O	-	-	O	O	O	+	+	+
PERCENTAGE	16.7	4.2	6.3	31.2	6.3	2.1	2.1	8.3	4.2	10.4	2.1	2.1	2.1	2.1

SPINAL FLUID CULTURE: 40 POSITIVE, 7 NEGATIVE, 1 NOT DONE 85.1%
BLOOD CULTURE: 15 POSITIVE, 27 NEGATIVE, 6 NOT DONE 35.7%
SPINAL FLUID SMEAR: 29 POSITIVE, 10 NEGATIVE, 9 NOT DONE 74.3%

NUMBER OF CASES	APPROX. PERCENTAGE	SPINAL FLUID SMEAR	SPINAL CULTURE
24	50 %	+	+
4	8.3%	+	−
9	18.75%	−	+
1	2.1%	−	−
7	14.7%	O	+
2	4.2%	O	−
1	2.1%	+	O

+ = POSITIVE
− = NEGATIVE
O = NOT DONE

CHART III

were negative. This re-emphasizes the importance of routinely culturing the spinal fluid in spite of a failure to find organisms on smear.

Of the 60 cases, 48 were proven to be meningococcic meningitis by either one or more of the following positive tests:—spinal fluid smear, spinal fluid culture and, or, blood culture (Chart III), but in the remaining 12, the causative organism was not found (Chart IV). A possible reason for the failure to isolate the causative organism in these 12 clinical cases may have been that in some instances the blood cultures were discarded before at least fourteen days observation, a point stressed by Denny *et al*[8].

12 CLINICAL CASES OF MENINGITIS

NUMBER OF CASES	6	2	2	1	1
SPINAL FLUID CULTURE	–	–	–	O	O
BLOOD CULTURE	–	O	O	–	O
SPINAL FLUID SMEAR	–	O	–	–	–

SPINAL FLUID CULTURE: 10 NEGATIVE, 2 NOT DONE
BLOOD CULTURE: 7 NEGATIVE, 5 NOT DONE
SPINAL FLUID SMEAR: 10 NEGATIVE, 2 NOT DONE

NUMBER OF CASES	SPINAL FLUID SMEAR	SPINAL CULTURE
8	–	–
2	O	–
2	–	O

– = NEGATIVE
O = NOT DONE

CHART IV

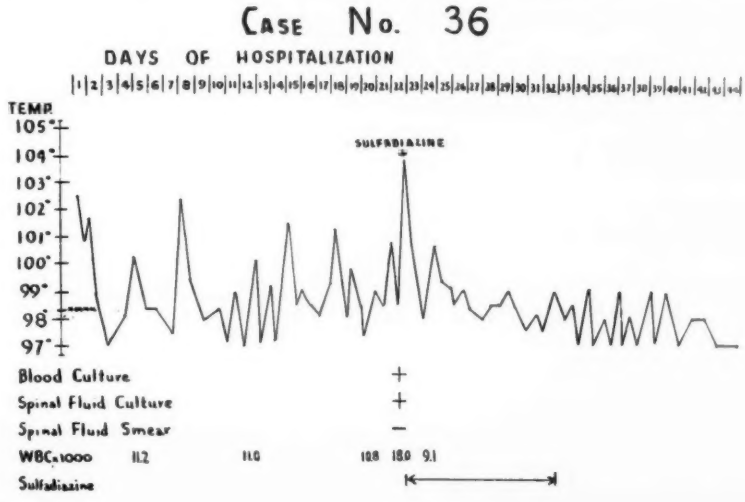
The blood leukocyte count ranged from 4,200 to 32,000 and averaged 14,869.

Diagnosis. The diagnosis was not difficult when invasion of the meninges had occurred. Severe headache, often termed the most severe the patient had ever experienced, stiff neck, fever, chills, vomiting and rash usually suggested the correct diagnosis.

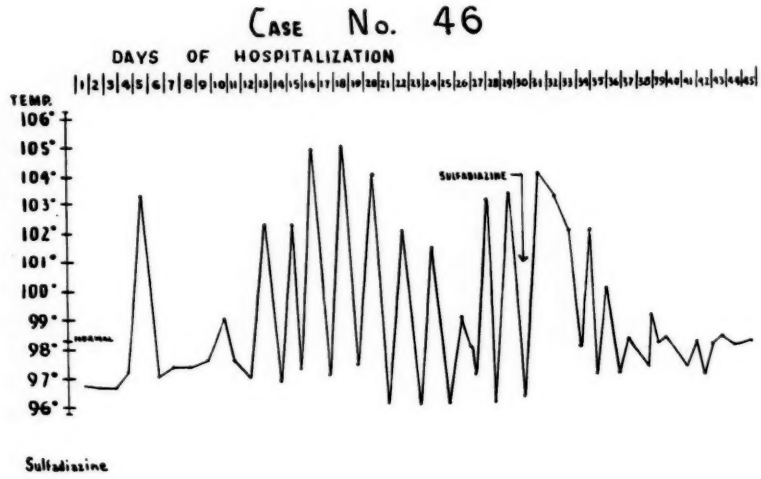
Every possible diagnostic aid should be used in addition to the blood and spinal fluid culture. Attention has already been called to the value of petechial smears[20-21]. Boger[23] states that intracellular and extracellular meningococci may be visualized in direct smears of the blood.

In a few cases, however, during the period of meningococcemia the correct diagnosis was not made; and only when signs and symptoms of localization in the meninges occurred was the true nature of the illness recognized (see Cases 36, 46, and 51).

Case 36. A 23 year old white officer was admitted on March 26, 1945, with a history of an upper respiratory infection. Temperature, pulse and respiration on admission were 102.6°-124-24. Three days later the patient developed pain and slight right knee swelling. Fever continued as shown in Chart of Case No. 36. On 17th hospital day he developed erythematous nodes 5 to 10 mm. in diameter over the distal ends of metacarpal bones and



three days later a node appeared on the little finger. On the 22nd hospital day the patient complained of severe headache and was found to have a stiff neck. Lumbar puncture showed turbid fluid with a W.B.C. count of 2,446 and a negative smear for organisms. Culture was positive for N. intracellularis, as was also the blood culture. On sulfadiazine therapy the patient made an uneventful recovery and was discharged on May 12, 1945.



Case 46. A 34 year old colored soldier was admitted on January 11, 1945, because of a duodenal ulcer demonstrable by X-ray. T.P.R. was 97°-70-16. On 5th hospital day the temperature rose to 103.2°, and the patient complained of headache, chills, muscular aches and pains. Fever continued as shown on Chart of Case No. 46. On 30th hospital day patient became confused and disoriented, complaining of severe headache with nausea and vomiting. He had positive Kernig and Brudzinski. Lumbar puncture showed cloudy fluid under increased pressure, 506 white cells (70% polys and 30% lymphs), gram negative diplococci on smear, and culture positive for meningococci. Blood culture was also positive for the same organism.

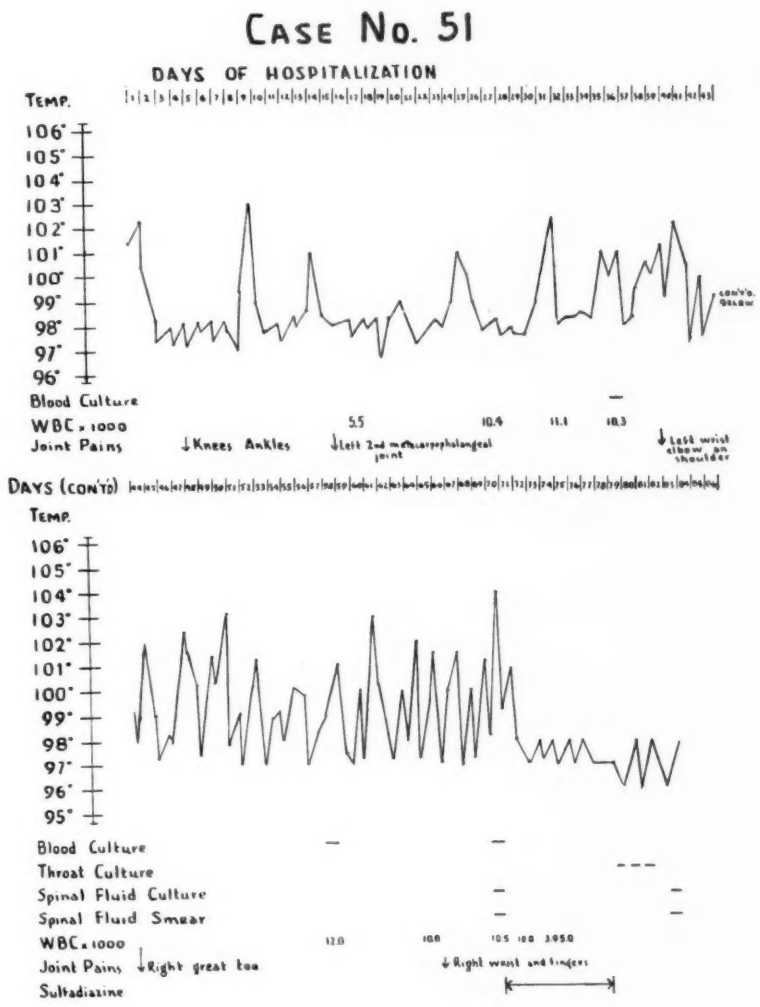
Sulfadiazine therapy was begun on 30th hospital day and patient recovered.

Case 51. A 25 year old soldier was admitted December 25, 1944, with nasopharyngitis. T.P.R. 101.6°-104-28. During the next 69 days he developed swelling, redness and pain in numerous joints —both knees and ankles, left 2nd metacarpophalangeal joint left wrist, elbow, shoulder, and right great toe. Laboratory data revealed a persistently elevated sed. rate ranging from 20 mm. to 32 mm. per hour; temperature curve is shown in Chart of Case No. 51. Two blood cultures were negative. On 70th hospital day the patient had a chill and the temperature rose to 104.4°. He complained of headache and vomiting. On physical examination it was noted that the neck was stiff and there were scattered maculo-papular lesions over the body. Lumbar puncture revealed cloudy fluid. By the 72nd day the patient's condition was much improved. Lumbar puncture on 83rd day revealed clear fluid. Eighteen days later all laboratory work was negative. Patient was up and about ward on the 108th hospital day and was given a convalescent furlough.

Treatment. Sulfadiazine was the sole specific drug used in 52 cases, while it was used in combination with anti-meningococcus serum in 3 cases, with penicillin in 5 cases and with sulfanilamide, anti-meningococcus serum and penicillin in 1 case.

The patients received an average total dosage of 7.75 grams of intravenous sulfadiazine and 49.3 grams orally for an average of 10.2 days of treatment.

Preliminary to the institution of specific therapy, the following procedures should be undertaken: Blood culture, throat culture, petechial smear and a smear of the peripheral blood. At the time of the initial lumbar puncture, a culture of the spinal fluid should be made with fluid dropping from the



needle directly into the warmed culture media at the bedside. Complete examination of the spinal fluid should include total and differential cell counts, smear for organisms, sugar, chlorides, globulin and gold curve.

Immediately following the lumbar puncture, 1,000 cc. of M/6 sodium lactate should be administered intravenously, followed immediately by five grams of sodium sulfadiazine in 100 cc. of distilled water without removing the needle. These two medications may be repeated in 8 hours if the patient is unable to retain oral medication. Blood levels of 10-12 mgm.% should be maintained until temperature has reached normal, and then levels of 5-8 mgm.% should be held for another 5-7 days. It should rarely be necessary to give more than 2 intravenous doses of sodium sulfadiazine.

When the patient is able to retain oral medications, 16 grams of soda bicarbonate per day in divided doses of 4 grams each may be given in lieu of the intravenous lactate. It should be emphasized that the bicarbonate administration should be continued for at least 48 hours after discontinuing the sulfadiazine.

Gilligan *et al.*[24] found that when using 5 grams daily dosage of sodium sulfadiazine but no alkali, 95% of the urines were acid and 43% of these showed crystalluria.

Fluid intake of 3,500 cc. and output of 1,200 cc. daily should be attained.

CONCLUSIONS

1. A clinical study of 60 cases of meningitis treated with sulfadiazine without a death is presented.

2. Forty-eight cases were proven to be meningococcic by laboratory methods, while 12 were considered to be "clinical" cases.

3. Alkalinization of the urine prevents renal complications.

4. Meningococcemia should be suspected in a patient with arthralgia and fever.

5. Sulfadiazine is considered the drug of choice in the treatment of uncomplicated meningococcic meningitis.

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609 Medical Arts Building.

THE PRACTICAL APPLICATION OF UNIPOLAR LEADS IN CLINICAL ELECTROCARDIOGRAPHY*

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It has been recognized for a long time that the standard or classical three lead electrocardiogram was inadequate for the more precise evaluation of cardiac abnormalities and, in many respects, could not be correlated with established physiologic principles and experimental observations. The fundamental defect of such leads is that they are *bipolar* and, as such, they represent the resultant of variations in electrical potential existing at two points which are about equidistant from the heart. For example, an upward deflection in lead III occurs when the potential in the left leg is more positive or less negative than the potential of the left arm, and a downward deflection occurs when the potential in the left leg is more negative or less positive than the potential in the left arm. This is illustrated in Figure 1, which has been drawn to show primarily the variety of extremity lead patterns that can give rise to different QRS waves in lead III. As can be seen, a Q wave in lead III results when the initial QRS activity as recorded in the left leg is more negative or less positive than the initial QRS activity recorded in the left arm, and, likewise, an R wave results when the left leg is more positive or less negative than the left arm. This same applies to all the waves in lead III, and similar relationships exist between the right arm and left arm with respect to lead I and the right arm and left leg with respect to lead II. Consequently, we cannot determine from the standard leads the actual potential that exists in the extremities nor what portion of the heart is responsible for the resulting form of the QRS complex. Because of these facts, there is very little about the standard leads that we can explain on fundamental physiologic principles, and much of our understanding and interpretations of such leads, both normal and abnormal, has been based on empirical knowledge, some of which is correct, some of which is open to question, and some of which has been misleading.

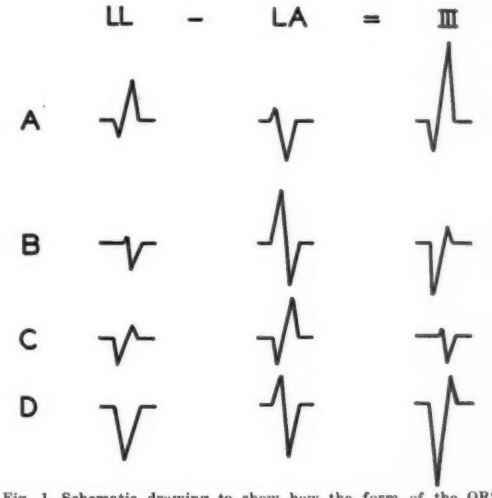

Fig. 1. Schematic drawing to show how the form of the QRS in lead III represents the resultant of the QRS patterns as recorded in the left leg (L.L.) and left arm (L.A.) (see text for details).

In their favor, it must be emphasized that standard leads have the benefit of long usage, and considerable empirical knowledge has been acquired regarding them. In most instances, they furnish adequate and sufficient information regarding the mechanism of the heart beat, the form of the P wave, and the state of impulse conduction, particularly auriculo-ventricular and to a less extent intraventricular. By experience we have learned that certain abnormal QRS and T wave patterns in the standard leads are indicative of distinct disease in the heart. For these reasons, the standard leads are quite helpful and few people would advocate discarding them.

However, they are bipolar leads and, as a consequence, have very definite limitations. They are influenced to a great extent by the position of the heart in the chest and, further, do not permit a

*Read before the annual meeting of the Medical Society of Virginia, at Roanoke, October 15, 1947.

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This work supported in part by the Thalhimer Brothers Research Fund.

precise evaluation of the potentials existing in different portions of the heart. They frequently may appear abnormal when no intrinsic heart disease exists, or fail to reveal pathology that is actually present. Such deficiencies are particularly apparent in the evaluation of Q waves and axis deviation, the differentiation of intraventricular block, the recognition of ventricular hypertrophy, and the determination of the location and extent of myocardial injury. Finally, the standard leads are unrelated to chest leads, and therefore cannot be correlated with them except empirically.

For these reasons, additional leads have been needed in clinical electrocardiography in order to evaluate the heart more accurately and to advance beyond the empirical knowledge which has been the sole approach to some electrocardiographic findings. Actually, unipolar leads have been in use for a long time, even antedating bipolar leads, but they were used chiefly for investigating purposes. They did not receive popular recognition until 1933, at which time the use of the 4th or chest lead for the better recognition of anterior myocardial infarction was inaugurated. This was essentially a unipolar type of lead and stimulated more widespread interest in the clinical application of such leads. Since then, many leads of this type have been devised and advocated.

Time does not permit nor is it within the scope of this presentation to discuss the physiologic concepts underlying this subject, some of which are unsettled and controversial. Nor is there opportunity to present the various patterns of unipolar leads, pointing out the normal and pathological features. This has been done most extensively and adequately in the publications of Wilson and his associates[1], Goldberger[2], and Nyboer[3]. However, there appears to be some confusion and misunderstanding regarding these leads, and it has been our observation that there is a tendency either to dismiss them as a research or investigative tool beyond the scope of the average electrocardiographer, or to use them extensively without a proper consideration of their significance. It is our purpose to present briefly the salient features of unipolar leads and indicate the particular usefulness they have in clinical electrocardiography with the hope of clarifying some of the misunderstanding and stimulating interest in their more universal development and use.

A unipolar lead is one in which, for practical purposes, the resulting tracing represents the variations in electrical potential recorded by an exploring electrode, which is close or closer to the heart. This is true because the other electrode in the circuit, called the indifferent electrode, is located at a point more distant from the source of electrical activity in the heart, and since the intensity of this electrical activity diminishes with the distance, the potential variations recorded at this latter electrode are small and insignificant in comparison to that recorded by the exploring electrode. However, there is no region on the surface of the body that shows constantly a zero potential, so, no matter where such electrodes are placed, they are only relatively indifferent and the resulting lead is only *essentially* unipolar. Such a lead is one in which the exploring electrode is paired with a single indifferent electrode which is placed somewhere on the body, usually an extremity. These leads are satisfactory in many instances, but, at times, there may be sufficient variation in the indifferent electrode to produce a false normal or false abnormal tracing.

A truly unipolar lead is one in which the indifferent electrode is actually of zero potential throughout the cardiac cycle and the resulting tracing, therefore, represents a true picture of the electrical potentials recorded by the exploring electrode. This is accomplished by attaching the indifferent lead wire to a central terminal which is connected to all three extremities. We will not go into the theoretical basis of this or the controversy that exists regarding its validity, but in actual practice an electrode connected to such a terminal is for all practical purposes constantly about zero. This type of terminal was originally described by Wilson and his co-workers and is spoken of as a "V" terminal and the resulting leads called "V" leads.

The exploring electrode, which actually records the potential variations we want to interpret, has been and can be placed almost everywhere on the body. The more common sites and the ones with which most of us are familiar are those located over the precordium, the so-called "chest" or "precordial" leads. This may be a single lead taken at the apex (IV) or multiple leads at points across the precordium from right to left (1 to 6). However, others have been utilized at times, such as the ensi-

form process, the angle of the left scapula, esophageal leads, etc. In fact, at a recent meeting, 32 chest leads, consisting of eight points along each of four horizontal lines completely encircling the chest, were advocated. Finally, we have the extremity unipolar leads, and we emphasize *unipolar* because the standard leads, which are bipolar, are sometimes loosely spoken of as extremity leads. These unipolar leads were used originally by Wilson and his associates and recently have been studied extensively by Goldberger. As the term implies, the exploring electrode is placed in turn on each of three extremities (right arm, left arm and left leg), and the potential variations of each extremity recorded. Goldberger has modified the original technique of Wilson which produced complexes of rather low amplitude. By removing the connection to the central terminal of the particular extremity that is being "explored" there is produced a so-called augmented unipolar limb (or extremity) lead.

As can be seen, a unipolar type of lead has several distinct advantages. In the first place, the resulting tracing represents the actual electrical potentials existing in the heart underlying or facing the exploring electrode. Hence, by placing this electrode in various positions around the heart, the electrical activity of all portions of the heart can be studied and evaluated. In addition, these leads, while *semi-direct*, are similar in form to the *direct* leads which have been obtained in animal and a few human experiments. They, therefore, can be evaluated on the basis of very definite physiologic concepts and experimental observations.

With this review of the nature of unipolar leads, let us now discuss the particular usefulness that they possess. In general, unipolar leads, because they record the potential variations of the particular portion of the heart underlying or facing the exploring electrode, give definite and precise information. With such a technique, we are able to recognize distinctive normal patterns as well as the characteristic abnormal changes produced by disease in various parts of the heart.

Multiple precordial leads (see Figures 2 and 3), either 1 through 6, according to the criteria of the American Heart Asociation, or at least 2, 4, and 5, record the patterns of the right ventricle and the anterior portion of the left ventricle, depending somewhat upon the position of the heart in the

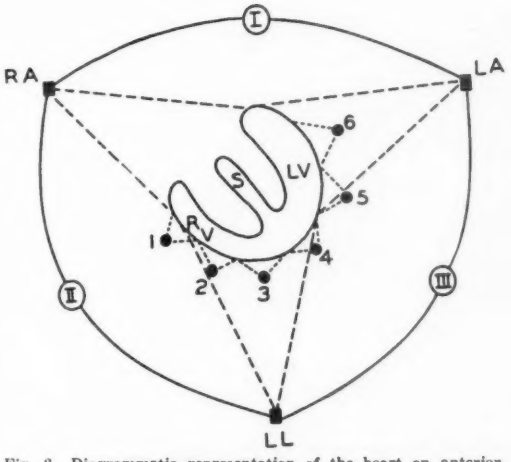

Fig. 2. Diagrammatic representation of the heart on anterior projection to show the relationship of the exploring electrodes to various parts of the heart. The relationship of the standard leads to the unipolar extremity leads also is demonstrated. RV, right ventricle; LV, left ventricle; S, septum; 1, 2, 3, 4, 5, 6, precordial electrodes; RA, right arm electrode; LA, left arm electrode; LL, left leg electrode; I, II, III, standard leads.

chest. At times, it may be necessary to extend these to the 7th (posterior axillary line) and 8th (angle of the left scapula) positions for complete study. These leads are particularly useful in evaluating intraventricular block, ventricular hypertrophy, myocardial infarction, and ventricular premature beats.

Unipolar extremity leads (see Figures 2 and 3), augmented according to the technique of Goldber-

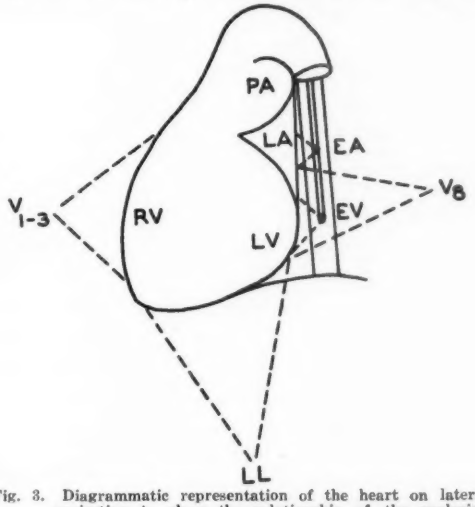

Fig. 3. Diagrammatic representation of the heart on lateral projection to show the relationship of the exploring electrodes to various parts of the heart. RV, right ventricle; LV, left ventricle; LA, left auricle; PA, pulmonary artery; V1-3, precordial electrodes; V8, electrode at angle of left scapula; EA, esophageal electrode at level of auricle; EV, esophageal electrode at level of ventricle; LL, left leg electrode.

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ger, are, in most cases, of academic interest only. In other words, they often do not reveal pathology which was not apparent in other leads, but are frequently helpful in clarifying borderline or atypical changes in the standard leads. They will explain why certain abnormalities are present in one or another of the standard leads, and, therefore, help to determine whether these abnormalities are physiologic or are the result of intrinsic heart disease. They determine very accurately the electrical position of the heart in the chest, but this determination has no particular clinical value in itself. It has been our experience that the electrical position as determined electrocardiographically does not always agrees with the anatomical position as observed fluoroscopically. However, besides this academic value, there are certain instances where one or another of these extremity leads are helpful. The right arm lead, because it faces the ventricular cavities through the openings of the great vessels, is sometimes useful in identifying subendocardial lesions, such as coronary insufficiency. The left arm lead faces the epicardial surface of the left ventricle when the heart is horizontal, and the right ventricle when it is vertical. The left leg faces the epicardial surface of the left ventricle when the heart is vertical and of the right ventricle when it is horizontal. The left leg (see Figure 3) also faces the diaphragmatic surface of the heart, and is particularly useful in evaluating the significance of a Q wave in lead III (see Figure 1.)

Esophageal leads (see Figure 3) are taken in two locations, one at the level of the auricles, the other at the level of the ventricle. The former shows auricular activity very clearly and hence is of considerable value in determining certain auricular rhythms that are unidentifiable by other leads. It also faces the ventricular cavities and thereby furnishes information regarding these regions. The ventricular esophageal lead faces the posterior surface of the heart and is helpful in revealing posterior myocardial infarctions. However, it is not of greater value in this regard, probably, than a unipolar left leg lead.

There are many other points where the exploring electrode can be placed, the upper back, the shoulders, the right upper abdomen, etc., and all have been utilized by one person or another. However, in our experience, most of these have no practical clinical value except in very infrequent instances.

In the foregoing, we have attempted to show what unipolar leads are and what they can demonstrate. How do we apply all of this to practical clinical electrocardiography, and how should these supplementary leads be utilized? We want the electrocardiogram to tell us as much as possible regarding the status of the heart. That is, we want to know, if possible, if any pathological process is present. On the other hand, and this is equally if not more important, we do not want to misinterpret or be misled by physiologic variations. Certainly, multiple unipolar leads help to recognize actual diseases in the heart and to clarify whether electrocardiographic abnormalities are pathological or physiological. And the more taken, the more help they are. However, from a practical point, the information obtained is not worth the time and trouble of taking all these leads routinely. After all, taking 10 to 16, or 32 leads is an extensive procedure and is impracticable for every patient.

From our experiences we believe that 3 standard and 3 chest leads are advisable for an adequate routine electrocardiographic study. Because a single precordial lead reflects chiefly electrical activity of a limited part of the heart, more than one is usually necessary to be sure that the heart has been adequately studied from an electrocardiographic point of view. We have adopted chest positions 2, 4, and 5 because these will demonstrate the patterns of both the right and left ventricles in most instances. If these leads are normal, we consider them sufficient and that the heart is normal as far as the electrocardiogram is concerned. If abnormalities are present in any of these leads, additional ones are necessary. These usually include more precordial leads, V1 to V6, and sometimes V7, and V8. Unipolar extremity leads also are taken, in most instances for academic interest, but in addition because they have specific value in the particular instances mentioned. Where there is an indeterminate type of arrhythmia, esophageal leads are used for clarification.

The indifferent electrode should be as nearly zero as possible. Using one of the extremities, such as the right arm or left leg, is quite satisfactory in most instances because the potential recorded at this point is insignificant compared to that recorded at the exploring electrode. However, there will be

occasional cases in which the potential at the indifferent electrode will be sufficient to distort significantly the resulting tracing, so that a central terminal is preferable and is just as easy to do with the newer electrocardiographs.

We are confident that the more precise evaluation of intraventricular block, chamber hypertrophy, and the location and extent of myocardial injury, which these leads allow, will result in improved diagnosis and should lead to more accurate prognosis and, perhaps, better treatment in the future.

CONCLUSIONS

1. Standard leads are inadequate for the more precise and complete electrocardiographic study of patients.

2. Accessory leads, all of which are unipolar in nature, permit more accurate evaluation since they can be judged on the basis of established physiologic principles and experimental observations.

3. Such leads are particularly valuable in the identification of obscure rhythms, disturbances in intraventricular conduction, ventricular hypertrophy, and the location and extent of myocardial infarcts. They are useful also in differentiating physiologic and pathological changes in the standard leads.

4. The three standard leads and at least three precordial leads are recommended for routine use. Additional leads are necessary should abnormalities appear in these routine leads.

5. The more universal application of these accessory leads should result in more accurate diagnosis, prognosis and treatment.

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DISCUSSION

DR. R. EARLE GLENDY, Roanoke: Electrocardiography is somewhat analogous, in reverse, to Mr. Winston Churchill's famous remark concerning the Royal Air Force after the Battle of Britain—"Never have so many known so little about so much."

As Dr. Porter has pointed out in his paper, much of our knowledge of the conventional electrocardiogram is on an empirical basis from long experience with familiar patterns. The more recent knowledge of this subject, as with so many other diagnostic and therapeutic procedures, is growing out of a greater appreciation of sound physiological and electrical principles.

It is apparent from what has just been said that recourse to the supplementary electrocardiographic leads offers a more accurate and complete representation of what is actually taking place in the heart, particularly in disturbances of intraventricular conduction, in heart strain of various types, and in myocardial infarction. It is easy to see now the limitations of older methods and the value of the newer ones.

Although the electrocardiogram is a precise objective record, its interpretation has been and always will be to some extent as subjective as any other form of clinical interpretation. Its value will depend upon the ability and experience of the cardiographer. Once experience has been gained, especially in the use of the exploring or unipolar electrodes, their value will become quickly apparent; and in many instances the interpretation can be made in a more objective way in terms of not only the general location but also the extent of damage present.

I believe that herein lies the real value of unipolar leads and exploratory electrocardiography, in allowing us to eliminate to some extent the subjective or personal element in interpretation. It stands to reason that much more information can be obtained by measuring potentials in the immediate vicinity of the heart than by the measurement of differences of potential in various parts of the body.

PROTRUDED CERVICAL INTERVERTEBRAL DISK SIMULATING HEART DISEASE.*

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Mount Jackson, Virginia.

The condition of protruded intervertebral disk has become well-known in the last few years, and clear-cut pictures can be diagnosed easily today. The location in the cervical region is less frequent and shows more difficulty in diagnosing. The following case history and its evaluation is meant to help in understanding this syndrome better.

The patient was a 39 years old female. Her past history was uneventful: no diseases or operations. In 1942, she fell from a chair and landed on her back. After some minor discomfort for some time the pain abated.

In April, 1946, pains in her left shoulder started, gradually radiating into her left upper arm. In the following months these pains spread to the lower aspect of her neck and into her left hand. Whenever she got these attacks she felt like "fainting". Her heart was "running away", as she expressed it. She got these spells more frequently when moving around or lifting. Some doctors treated her for neuritis; some diagnosed a heart condition and recommended rest.

I saw this patient the first time in November, 1946, and found the motion of her neck in any direction very painful. Loss of the normal cervical curvature was present. Excruciating pains were produced by hyperextension of the neck. The skin over the whole arm was tender. There was some numbness in her fingers. A weakness in flexion of the thumb and index finger was noticed. Slight atrophy of the thenar and hyperthenar eminences was present. All deep reflexes of the left upper extremity were hyperactive. Analgesia of the entire index finger and thumb was noticeable. The lower cervical vertebrae and first thoracal vertebra were slightly tender.

Examination of lungs was normal. The heart showed normal size and clear sounds. Blood-pressure was normal, as was X-ray of heart and lungs. The electrocardiogram did not show any signs of coronary involvement nor did any signs show up after an exertion-test. Laboratory examinations were normal. X-ray of the spine did not demonstrate any pathology in cervical or thoracic part except slight narrowing of the joint space between 6th and 7th cervical vertebrae.

During the time when I had the patient under my observation the severeness of the pains made frequent doses of codein and morphine necessary, but relief was only temporary.

I came to the conclusion that this was a case of herniation of a nucleus pulposus in the lower cervical spine and sent the patient to the neuro-surgeon of the University Hospital, in Charlottesville, who confirmed the diagnosis. He operated on this patient and removed—under pentothal anesthesia—a herniated nucleus pulposus between 5th and 6th cervical vertebrae on the left side. The post-operative condition was satisfactory. The patient has been feeling fine ever since, with no recurrence so far.

A few words seem necessary here about anatomy and pathology. The intervertebral disk is a compressible fibro-cartilaginous structure with a thickened outer ring, an annulus fibrosus. Central to this structure is the elastic jelly-like cushion—the nucleus pulposus. It is important to realize that the intervertebral joint capsule is thinnest posteriorly and hence more vulnerable to sudden stress and repeated tension. Because of the poor blood supply of the intervertebral disk reparative processes are markedly limited. The posterior longitudinal ligament, stretching from the base of the occiput to the lower end of the sacrum, is thinnest in the cervical and lumbar region and is weakest between the vertebrae where it fans out laterally.

This explains two phases of the clinical picture: As the lateral portions of the ligament are the weakest parts, the protrusion is most likely to occur laterally and to result in root pain if the corresponding root is irritated or compressed. If the posterior longitudinal ligament is unduly stretched, low back pain may alone result from the protrusion of the disk.

Since the classical paper by Mixter and Barr in 1934, publications on this subject have been nu-

*Read before the Medical Society of Northern Virginia, December 9, 1947, at Woodstock.

merous. Lumbar protrusions are by far the most common, constituting about 95% of all protrusions of intervertebral disks in the experience of the Mayo Clinic. The lesions in the lumbar region appear clinically as low back pain, back strain, sciatica, and the differential diagnosis has to rule out neoplasm of the spine, congenital anomalies and degenerative diseases. Case history and careful clinical examination have proved more helpful here than the use of contrast mediums. Contrast fillings are not always positive, but might have to be used in certain cases. Spinal puncture will help only in the evaluation of tumors, as high values of protein of 100 mg. per 100 cc. are rarely seen in cases of protruded disks and are highly suspicious for neoplasm.

As herniation in the cervical region is less frequent than in the lumbar region, it invites a wrong diagnosis more frequently. An undetermined number of patients with pains in the precordium, in the shoulder and arms, who were thought to have coronary thrombosis or angina pectoris, will be found to have a rupture of one or more of the lower cervical disks. Other diagnosis might be arthritis of the cervical spine, brachial plexus neuritis, bursitis or cervical ribs. Location on the left side will make the diagnosis sometimes very hard and will require the skill of the examiner as well as all diagnostic means available.

It is worth recalling the signs and symptoms which are presented in such a case where the location is on the left side to fully understand the difficulty of the diagnosis. The pain in the left neck radiates into the shoulder, to the precordium and down the arm, associated with stiffness of the neck, weakness in the arm and hand and numbness of one or more fingers. The pain is at times acute and severe and aggravated by coughing and sneezing. Sometimes the pain begins in the anterior part of the chest over the heart and may radiate to the shoulder, the neck and arm. This precordial pain may be of such severity as to overshadow any other symptom, although there is usually radiation to the shoulder and arm. Frequently the presence of any pain in the neck is determined only after the patient is closely questioned. The pain in the chest may be related to exertion. It is easy to understand that the diagnosis is not infrequently confused with angina pectoris or coronary disease.

History of trauma to the neck when present may be quite helpful for diagnosis, but is often absent. The trauma is sometimes so many years back that the patient does not remember it anymore. Absence of physical and laboratory signs of coronary disease, normal exercise tolerance, lack of relief by nitroglycerine and similar drugs together with a negative electrocardiogram should make the physician highly suspicious of a ruptured cervical disk. It should be noted that errors with the contrast medium are greater in the cervical spine; the reason for it is that the lesions are smaller here, that they may be so far lateral they are not in contact with the dura, and because it is more difficult to fill the cervical canal with contrast medium. Is the diagnosis certain? The difference in the prognosis should be clearly explained to the patient, for it is just as important to relieve the patient's anxiety as it is to relieve his pains.

The causing trauma may be either acute, such as sudden lift or twist, often followed by a feeling of a snap in the back which brings a halt to whatever the patient may be doing, or chronic, such as is experienced by people whose activities call for repeated bending, lifting and twisting, or those who are subject to jarring forces, as riding in trucks and working with vibrating machinery.

In the acute phase the compressive forces cause a tear, not only in the posterior joint capsule but also in the lateral and weakest portion of the posterior longitudinal ligament. As a result, there may follow disorganization and fragmentation of the annulus fibrosus, the fibro-cartilaginous rings and a displacement of the nucleus pulposus. As a sequence, a bulge appears at the weakest point of the joint capsule and is the cause for the backpain.

With rest and other conservative measures the bulge may recede, the backpain subside and the tear heal. Nevertheless, some degeneration of the involved structures takes place. Then follow herniation and sequestration of joint contents which may not be reducible. If sufficiently large, the extruded portion of the disk irritates and compresses the nerve root with resulting radiation of pains, paresthesia or numbness in the distribution of the involved nerve root.

In case of chronic trauma, there is a slow, progressive degeneration of large areas of the nucleus pulposus and the adjacent structures that finally lead to the same picture as in the acute changes.

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Conservative treatment is justified provided the pain can be controlled and recurrences are not observed at short intervals or with great frequency. In the acute episode absolute bed-rest and application of heat to the involved part is indicated. The use of diathermy is often helpful. In the more severe attacks traction on the head or on the lower extremities, depending on the location, proves of benefit.

When surgery is necessary the procedure will involve removal of the disk through a comparatively small exposure and fusion of the spine if indicated. If spinal fusion is not required, the patient will be up within a short time and may resume normal activities in a few weeks. Following fusion, immobilization will be indicated for a longer period.

The rate of recurrence of protruded disks over a five year period is about 5 per cent in reports of some clinics. Avoidance of heavy lifting and straining until the posterior longitudinal ligament has had time to heal is advocated.

I have tried to recapitulate the picture of the protruded intervertebral disk and, by presenting a case with an unusual location in the cervical region, shown the importance of this special syndrome in differential diagnosis and clinical outlook.

General Health and Tooth Decay.

Observing that a group of Filipino children in poor general health had much better teeth than a group of local children in Hawaii in excellent health, Dr. Nils P. Larsen, Honolulu, says in the July 3 issue of J.A.M.A. that dietary factors are probably the determining element in freedom from tooth decay.

Dr. Larsen's paper, entitled "Tooth Decay in Relation to Diet and General Health," was based on extensive studies made of more than 1,000 children living on sugar plantations in Hawaii and 100 children who were brought in from the war-torn Philippines.

Although tooth decay in general is higher among children on a diet with a high carbohydrate content —that is, one of starches and sweets—Dr. Larsen emphasized that this is not always the case; that some children on such diets have very good teeth. The reported observations in Hawaii suggest that other factors than the acid base balance or vitamin A may account for the striking difference in decay in the various groups of children observed.

"Heredity," he says, "does not seem to play an important role in this condition. Hawaiians on the Polynesian diet for 800 years had excellent teeth, while first generation Hawaiians on the Oriental diet of rice had poor teeth. Filipino children in the Philippines had little tooth decay, while Filipino children in Hawaii had much."

Indications are, Dr. Larsen said, that it is not sugar or vitamin intake themselves which determine tooth decay or lack of it, but rather whether certain protective substances, such as fluorine or oxalate, are added to the diet. "The Hawaiians on their ancient diets consumed much seafood which is high in fluorine," Dr. Larsen says. "They probably also swallowed more ocean water, which is high in fluorine. They also ate much taro and poi which is high in oxalate—a possible tooth decay preventive, as might be vitamin K which is present in raw sugar cane."

Dr. Larsen indicated the possibilities are strong that people with the best teeth are those whose diet consists of a combination of foods whose chemical makeup prevents the over activity of acid-forming bacteria. Such diets contain not only fluorine and oxalate, but foods with a high alkaline residue.

TREATMENT OF BRONCHIAL ASTHMA*

K. D. GRAVES, M.D.,
Roanoke, Virginia.

Since allergic asthma is usually caused by exposure to one or more of three classes of offenders, viz., inhalants, ingestants and bacteria, the first step in the treatment of allergic asthmatics is to discover the cause.

Two measures are of chief importance in this—history taking and skin testing.

History:—In taking the history attention must be directed to heredity, seasonal occurrence, frequency of attacks—day or night—what precipitates an attack and what is done for relief; also environmental factors such as animals in the home, use of feather pillows, cathartics, or other drugs, occupation, idiosyncracies and hobbies.

It often happens that a vital feature in the history is overlooked. I recall the case of an elderly lady who reacted strongly to wheat and was not improved by taking from her all forms of wheat. In the course of time her husband passed away and her asthma stopped almost miraculously. Further investigation revealed the fact that the husband was a miller and kept his work clothes in the bedroom at night.

Skin tests are of great importance but are not always of conclusive significance. It is very possible for a patient to give a negative skin test to something he is sensitive to and *vice versa*—he may give a positive reaction to some substance which is of negligible importance.

After the causative factor is discovered, the next step is to get rid of it if possible. Offending foods should be omitted from the diet, feather sensitive cases should have their pillows covered with an impervious pillow case, dust cases should have their home, particularly their bedroom, rendered comparatively dustless, etc.

Infections, particularly infected sinuses, tonsils and teeth, should be cleared up; but this alone, although very helpful, rarely cures a case of asthma. It is my strong impression that a great many sinus cases are allergic in origin rather than *vice versa*. Bacterial vaccines are of value in many cases and I have been particularly impressed by the use of autogenous vaccines prepared by the Cohen-Heist technique. In my last 58 cases of asthma in which cultures were made, I have obtained streptococci in pure culture in 75% of them by this method.

Drugs:—Of the medicinal measures adrenalin is still the sheet anchor. It may be used by spray, or hypodermically in either aqueous solution or suspended in oil; the advantage of the aqueous solution is its speed of action. Small doses repeated if necessary are preferable to larger doses which produce unpleasant reactions.

DRUGS — ROUTINE
CHOICE OF
ADRENALIN
EPHEDRINE
IODIDES
AMINOPHYLLIN—BY MOUTH OR RECTUM
SALINE CATHARTICS
BARBITURATES

Fig. 1.

DRUGS — FOR MORE OBSTINATE CASES
ADRENALIN
AMINOPHYLLIN — INTRAVENOUSLY
ETHER IN OIL PER RECTUM
CALCIUM INTRAVENOUSLY
OPIATES IN SELECTED CASES

Fig. 2.

Ephedrine is probably next in importance. I prefer as a rule to administer this in solution in multiple drop doses so the patient can regulate the dosage according to his individual reactions and requirements.

Aminophyllin is valuable and may be given by mouth, intravenously, or by rectal suppositories.

PHYSICAL MEASURES
OXYGEN (WITH OR WITHOUT CO_2)
HELIUM
AIR FILTER
IMPERVIOUS COVERINGS FOR PILLOWS AND MATTRESS
DUST PRECAUTIONS
CHANGE OF CLIMATE

Fig. 3.

Physical measures of service are mainly oxygen (with or without CO_2), helium, air filters, impervious coverings for pillows and mattress, dust

*Read before the annual meeting of the Medical Society of Virginia, at Roanoke, October 13-15, 1947.

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precautions—including removal of animals and flowers from immediate environment—and occasionally change of climate.

The next step in treatment is desensitization for cases who are not relieved by the discovery and removal of offending atopen; in many cases, such as dust, this is impractical if not impossible. In these cases hyposensitization is advisable. In this, two precautions should invariably be followed—to start with dilute extracts, and to keep the patient in the office for from 15 to 30 minutes following each injection so remedial measures can be taken if he has a constitutional reaction. I have been impressed by the advantage of combining an autogenous vaccine with the extract to be used and am almost making this a routine practice at present in all but the pollen cases.

Prognosis:—"Once an asthmatic, a patient is usually a potential asthmatic for the rest of his life just as a diabetic is potentially a diabetic for the rest of his life, whether his urine is sugar free or not."[1]

"Many factors such as the social and economic status and the intelligence of the patient frequently influence the outcome."[1]

I believe that comparative relief can be obtained in something like 80% of the private practice of cases; but as asthma is an hereditary condition it is well to speak of results in terms of relief rather than cure.

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Medical Arts Building

DISCUSSION

DR. OSCAR SWINEFORD, JR., Charlottesville: Anything that causes such widespread discomfort as asthma deserves a good deal of emphasis in any meeting of physicians who treat it. Dr. Graves has outlined most of the remedies available to physicians who assume this responsibility. There are several points that I might emphasize.

Many mild cases who wake up at night with sufficient difficulty to require medical attention will avoid the nocturnal attacks if they take an aminophyllin suppository and ephedrine by mouth at bedtime. The ephedrine can be combined with barbiturates when sedation is desired. The mixture can be dispensed in gelatin capsules and in enteric-coated tablets for prolonged ephedrine effects.

Dr. Graves pointed out, quite properly, the fallibility of skin tests in the recognition of the etiological factors in asthma. A detailed history which brings out the role of infection, foods and inhalants, does not require laboratory equipment. A large percentage of victims of asthma need not be sent to allergy specialists. The procedures which Dr. Graves has mentioned, particularly food and inhalant avoidance based on history, dust-proof mattress and pillow cases, a reduction in dust-collecting or dust-making materials in the environment, plus the early treatment of sinus infection, will take care of a high percentage of asthmatics. Those who do not get complete relief from these procedures should be studied by someone with the necessary skill and equipment.

Our experience with infectious asthma has differed somewhat from that of Dr. Graves. Most of these cases have sinus infection. To relieve them it is necessary to cure the sinus infection. That problem is too detailed for discussion here, but if the asthma patient is operated upon for cure of sinus disease the operation should be a complete one. There should be no operation until all conservative means have been exhausted. But if the operation is to be done, every diseased sinus should be cleaned out by radical surgery. In our opinion, the establishment of drainage does not cure infected allergic sinus disease.

We, too, use a great many vaccines. Our experience with the autogenous ones has not been so successful. The reason for it has become apparent recently. In no case so far have we found a common organism when each of the diseased sinuses was cultured at operation. We have found as many as five different organisms in pure culture in five different sinuses in the same person.

I hope all of you will study the tables Dr. Graves has in his paper, because there are some very useful data which will help you to help your patients.

A MEMBER: I should like to mention just two things, sir. One is that Dr. Graves did not mention myocardial failure. Often these asthmatic patients have not only asthma but myocardial failure, and unless you treat the congestive failure you will not get relief from the signs of failure.

Next, I want to emphasize the use of autogenous vaccine. Unless the material is properly obtained and the vaccine properly made, it will not be of any value. You should do that just as carefully as if getting a specimen of blood and administer it as carefully as you do X-ray treatment, because you can make a man very sick by giving him too much.

I enjoyed the paper and the discussion.

A MEMBER: I should like to ask why Dr. Graves did not mention pyribenzamine and benadryl?

DR. GRAVES, closing the discussion: I thank the gentlemen for discussing my paper.

There are several drugs I did not mention—pyribenzamine, benadryl, and a number of others. These are pretty new; and it has been my experience, and I have gleaned from the literature, that P.B.Z. particularly is especially useful in hay fever rather than asthma.

As to the vaccine, the principle of the technique that I referred to, the Cohen-Heist technique, is that the patient's blood will kill out the organisms to which he is immune and will permit the organisms to which he is not immune to live. I have found it very satisfactory.

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THE NUTRITIONAL MANAGEMENT OF THE NEPHROTIC SYNDROME

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and
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Various types of diets have been advocated frequently as therapeutic measures in the control of the nephrotic syndrome. Among these diets, a high protein intake has been favored by the majority of workers[1]. At the present time, however, a moderate viewpoint has been taken and more normal food intakes are offered to these patients[2]. Unfortunately, it is often difficult to administer even normal diets by the usual methods, particularly during the edematous phase of the disease.

When dealing with postoperative surgical patients and with malnourished children, it has been our experience that therapeutic diets are more readily administered when they are given in liquid form at frequent intervals[3,4]. During the last twelve months, three nephrotic patients have been studied in which the majority of foodstuffs have been given in liquid form. Nitrogen balance studies were carried out over relatively long periods of time. The diet which was given in each case was made up according to age and varied with the clinical course of the patient.

The special liquid mixtures that were used throughout the study were designed to supply a liberal protein, high calory, and low sodium chloride intake. Since it has been shown that abnormally large quantities of plasma proteins may be lost in the urine of nephrotic patients, it was deemed advisable to include in the therapeutic diets, proteins which would approach the amino acid composition of the plasma proteins. Additional methionine and cystine were also included with the idea of favoring fabrication of plasma proteins[5]. Carbohydrates supplied a large share of the calories both when the liquid form of diet was given as the only food intake and when supplementary foods were administered. Only a moderate amount of fat was included in the therapeutic diet as high fat feedings have been shown to cause wide fluctuations of serum lipids in nephrotic patients[6]. The sodium content of the mixtures averaged between one-half to two grams as sodium chloride per day.

The first chart is a typical formula of the special diet used in these three cases. This particular formula was given a five year old patient over a two month period. Selected foods, mainly of a carbohydrate nature were also offered along with this mixture. The large amount of calcium carbonate which has been included in the formula is based upon the work of Emerson and his associates who have shown that nephrotic patients assimilate calcium salts very poorly[7]. As a consequence, we have endeavored to supply an additional amount of this mineral in accordance with their data. The protein intake as shown by this formula amounted to approximately four and one-half grams of protein per kilogram of ideal body weight in this patient. Vitamins and essential minerals such as iron and copper were either mixed with the diet or were given in the form of daily medications.

SPECIAL FORMULA : CASE W.E.

Skim Milk Powder	66 GM.
Whole Milk Powder	90 GM.
Casec	26 GM.
Egg Whites	2
Dextri-Maltose #2[1]	150 GM.
Methionine (DL)	0.5 GM.
Cystine (L)	0.5 GM.
Copper Sulfate	3 MG.
Ferrous Sulfate	65 MG.
Calcium Carbonate	1.6 GM.
Oleum Percomorphum[1]	1 C.C.
Syrup of Pantabee[2]	8 C.C.
Pantabee Capsules[2]	2
Ascorbic Acid	75 MG.
Pyridoxine	1 MG.
Wheat Germ Oil	0.3 C.C.

1. Mead Johnson Company 2. Haskell Company

Chart 1.

The second chart shows the nitrogen balance data of a five year old patient over a sixty-six day period. A large nitrogen retention occurred which is much greater than that which would be required for normal growth. We feel that the nephrotic patient is usually in a semi-starved condition if the disease processes have been going on for any length of time. The capricious appetite of these patients, together with the excessive proteinuria, may rapidly deplete the general body tissues to a severe degree. Both Farr's work at the Rockefeller Institute and Peters' work at Yale seem to support this concept of tissue

wastage[8,9]. It can also be seen in this chart that in spite of large nitrogen retentions over a comparative long interval of time, the hemoglobin and

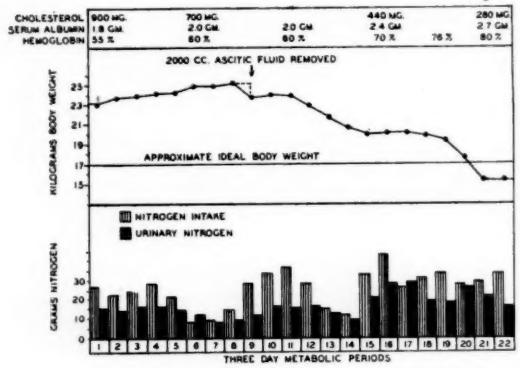
CHOLESTEROL 900 MG. 700 MG. 440 MG. 280 MG.
SERUM ALBUMIN 1.8 GM. 2.0 GM. 2.0 GM. 2.4 GM. 2.7 GM.
HEMOGLOBIN 55 % 80 % 80 % 70 % 76 % 80 %
2000 CC. ASCITIC FLUID REMOVED
KILOGRAMS BODY WEIGHT
APPROXIMATE IDEAL BODY WEIGHT
NITROGEN INTAKE
URINARY NITROGEN
GRAMS NITROGEN
THREE DAY METABOLIC PERIODS

Chart 2.

plasma protein concentrations did not increase until rather late in the metabolic study. This is compatible with the work of Whipple and that of Elman on protein-depleted dogs, and with our own studies on protein regeneration in surgical patients[10,11,4].

long periods of time before any favorable effect becomes evident. This is true even when the loss of plasma proteins by way of the urine has abated.

The third chart shows the nitrogen balance data of a two year old nephrotic patient over a 31 day period. It can be seen that this child also retained a good percentage of the ingested nitrogen. Proteinuria in this case was moderate to intense and varied from 4 to 9 grams of urinary protein per day. The plasma protein concentration never became greater than 3.9 grams per 100 cc. This patient in spite of his marked nitrogen retention over a relatively long period, never became edema free during the study.

The data that we have so far obtained on nephrotic patients suggests that there is rather poor correlation between the amount of dietary nitrogen retained and the loss of edema fluid.

The authors wish to express their appreciation to Dr. J. C. Forbes and Dr. G. H. L. Dillard for their interest and advice in carrying out this study. The authors are grateful to Dr. E. Kendig for making available two nephrotic patients.

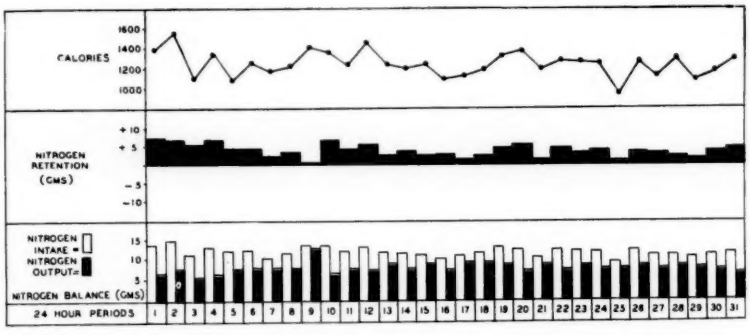

Chart 3.

Previously published work[3] showed the nitrogen balance data of a post operative patient given a high protein, high calory intake. Plasma volume determinations were carried out on this patient at various intervals and the total circulating hemoglobin and plasma proteins were calculated. It is seen that for every gram of plasma protein fabricated, about three grams of hemoglobin and about twenty-five grams of tissue protein were laid down. In other words, only about one thirtieth of the nitrogen retained was used in the formation of plasma protein. It is obvious in the case of the nephrotic syndrome in which protein depletion is manifest that optimal diets must be given over rather

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DISCUSSION

DR. H. ST. GEORGE TUCKER, Richmond: The treatment of the nephrotic syndrome has always been a vexing problem. The use of high protein, low salt diets has been widely accepted. Unfortunately this program has more often than not failed to raise plasma proteins or to relieve edema. Many types of diuretics, such as ammonium chloride, potassium chloride, mercurials, and urea, have been tried but without consistent success. Acacia solutions given intravenously to raise the plasma osmotic pressure have occasionally produced diuresis, but the results have been inconstant, and the dangers of acacia storage in the liver and spleen have discouraged its use. Plasma and whole blood transfusions have shown little effect in raising plasma proteins, and the salt content of these substances probably negates any diuretic effect. More recently salt-free serum albumin concentrates have become available. Theoretically, these preparations would seem to be ideally suited to the treatment of the nephrotic syndrome. However, again the clinical results have been disappointing. With very large amounts of serum albumin concentrate, plasma proteins may be temporarily elevated and diuresis occur, but the results are not lasting. Studies have shown that a large percentage of the albumin injected is very promptly lost in the urine. The cost of these preparations is considerable, and for any program of continued use becomes prohibitive.

Most of the recent work on nephrosis has emphasized the fact that the synthesis of plasma proteins by the liver is impaired. It seems established that in nephrosis the protein stores of the body as a whole are profoundly depleted as a result of prolonged protein loss into the urine. Under these circumstances there is strong competition for assimilated nitrogen between the needs for tissue protein, hemoglobin, and plasma protein. As Dr. Spence has shown, even when a positive nitrogen balance can be attained, only one-thirtieth of the retained nitrogen is available for plasma protein synthesis, the rest going to build tissue protein or hemoglobin. Thus the defect in plasma protein formation appears to be chiefly due to its low priority rating in obtaining available building material.

The logical treatment would seem to be a very high protein intake. However, there appears to be a limit to the amount of protein that the body can assimilate for any purposes. When dietary protein is raised above 3.5 grams per kilogram of body weight in children or above 2 or 2.5 grams per kilogram in adults, no increase in nitrogen retention occurs. The excess protein is simply converted into urea and excreted.

The problem then becomes one of supplying a diet that will maintain a positive nitrogen balance for long enough to restore all the depleted proteins of the body. This may take many weeks or months. Any well rounded high caloric diet containing a good amount of carbohydrate and a moderate excess of protein should be adequate, provided the patient takes it and takes it for a long enough period. Salt, of course, should be kept low.

Dr. Spence and his associates have proceeded along these lines. They have added certain amino-acids which are excessively lost in nephrosis, and certain minerals which appear to be deficient in these patients. They have shown that such a diet, prepared in concentrated liquid form, can be taken readily by both children and adults over long periods of time; that positive nitrogen balance can be maintained; and that utimately plasma protein regeneration can be seen. The number of patients treated has been small, but the results are promising. A contribution has been made both to our understanding of the nephrotic syndrome, and to the practical management of these patients.

I consider this an important paper. It has been a privilege to discuss it.

DR. BASIL B. JONES, Richmond: I have had the unfortunate experience in the last three years to run across two or three of these nephrotic children in my practice, and they certainly do present difficult problems for treatment. My last case was seen early in the course of the disease. This child had been under my care since birth, and he was about three years old when the disease started. I had suspected allergy to milk and to two or three other common foods as a cause of some of this child's previous troubles but milk had seemed to be the chief offender. I had had trouble keeping this child off of milk because he was very fond of milk and ice cream and the parents would give in if he begged for them. The fact that these indiscretions often preceded acute respiratory and tonsil infections apparently did not impress the parents the same way it did me. The child developed edema of the legs, scrotum and face and his urine was loaded with albumin. There were some hyaline casts in the first specimen of urine but no red cells or pus cells were ever found. He had a high blood cholesterol. His blood proteins had not fallen very low but there was a reversal of the albumin globulin ratio.

Considering the possibility that milk allergy might be the cause of his nephrosis, I insisted upon the parents keeping milk out of this child's diet. I put him on a fairly high protein diet with no milk protein and included dicalcium phosphate, liver extract iron and adequate vitamins. His edema cleared up quickly and his urine became perfectly normal in a month or less.

I have seen him several times since and he has remained in good health with no more edema. On at least two occasions I have found albumin in his urine and on questioning the parents have found that the child had gotten ice cream two or three days previously. Whether there is any real connection in this case between milk allergy and the nephrosis, I do not know. From a speculative standpoint it certainly seems possible. His treatment was based on that assumption and he responded as though that assumption were correct.

XUM

PHYSICAL MEDICINE IN GENERAL PRACTICE*

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The widespread absence of physical medicine in the armamentarium of the general practitioners of today is largely due to the cloud resting over such treatment because of the exploitation by quacks and irregular practitioners in past years. The Council on Physical Therapy, now known as the Council on Physical Medicine of the A.M.A., has for the past twenty-five years been evaluating the various physical therapeutic means. The importance of their conclusions can be illustrated by the fact that so much space was given for the physical medicine demonstration at the Atlantic City convention this year.

Physical medicine is defined as the diagnosis and treatment of disease by various non-medicinal means. Physical means employed are light, heat, cold and massage. Agents used in producing these properties are water, infra-red and ultra-violet light, diathermy, manipulations of the technician or the patient and various mechanical devices.

This discussion being necessarily limited, I will consider only the simple and inexpensive means available in any home or physician's office. Two cases will be presented that illustrate two common conditions: paronychia and upper respiratory infection.

Case 1. Mrs. T., housewife, age 44, gave history of having a "run around" on the second right digit which started with a "hang nail" four weeks before. Inspection revealed a typical paronychia with associated cellulitis and beginning lymphangitis extending into the forearm. Temperature 101° F. Patient refused hospitalization, blood count, surgical drainage, sulfa therapy or penicillin. She did agree to use a "contrast bath" to the right hand and forearm at home. (Demonstration of "contrast bath" to upper extremity).

CONTRAST BATHS

Equipment:

1. Two basins large enough to immerse arm to elbow.
2. Small pan.

Procedure:

1. Fill one basin with water as hot as patient can tolerate.
2. Fill other basin with water about 45° F.
3. Place small pan of water on stove or hot plate for reheating water as it cools.
4. Immerse affected part in hot water for two minutes then in cold water for 15 to 30 seconds. Continue alternating for 15 minutes, using cold last.
5. Add hot water during treatment as patient can tolerate it.
6. When treatment is finished, dry with towel.

Patient reported that drainage developed after three treatments and all redness and swelling were absent after three days.

Results of Treatment: Heat produces dilatation, and cold produces contraction of the blood vessels. The resulting increased flow of blood locally, aids the natural physiological processes for control of infection and repair.

Case 2. Mr. S., office worker, age 30. History of headache, coryza, general aching, fever and dry cough, starting 24 hours before. Temperature 100° F. Physical examination negative except for injected pharynx. Diagnosis:—Upper respiratory infection. (Demonstration hot foot bath, fomentations to chest, cold mitten friction, centripetal peripheral rub).

Result of Treatment: (1) Prolonged heat to the lower extremities by dilatation of local blood vessels causes decongestion of head, neck, and respiratory passages. (2) Short heat to the chest facilitates respiration and expectoration. (3) Short cold to the body with massage produces tonic and stimulating reactions of muscles and vessels through direct and reflex nerve reaction. (4) General result of treatment is redistribution of blood and tissue fluids with improved peripheral and splanchnic circulation.

Dr. J. S. Coulter, of Northwestern University, says, "Since water is so abundant and readily obtainable, its benefits as a therapeutic agent are often forgotten." Dr. Frank D. Dickson, of the A.M.A. Council, states: "Moist heat in the form of hot packs has several advantages. It is always available as it requires no special apparatus, since

*Read before the Southwestern Virginia Medical Society, at its semi-annual meeting, September, 1947.

the best pack material is that which contains a large per cent of wool, such as a piece of old blanket. Wool yields up heat more slowly than other forms of material. Moist heat in the form of packs is tolerated for longer periods and with less danger of skin reaction than dry heat. Moist heat, clinically at least, seems to have a greater analgesic effect than dry heat and certainly is more efficient in reducing inflammatory exudates."

The physiologic mechanism of local applications applied to various reflex areas of the body is well described by Dr. Fred Moor, past president of the American Congress of Physical Therapy. "Beginning with the skin, the stimulus produced by heat, cold, electricity, or mechanical means is conveyed to the spinal cord by sensory nerves, i.e., nerves of pain, temperature, and touch. In the spinal cord, the impulse is conveyed upward or downward to various levels by these sensory nerves, whose ends touch cells in the spinal cord which start other impulses over outgoing nerves. The impulses which are destined to influence an internal organ pass over nerves which enter the chain of sympathetic ganglia, and so pass with the sympathetic nerves to the internal organs. These efferent (outgoing) sympathetic nerves are connected not only with the blood vessels of the internal organs, but also with their muscles and glands. Because of these connections, every function of the body may be stimulated or depressed by influences arising in the skin."

Neurological knowledge of the reflex areas of the skin makes it possible to obtain very specific effects in treatment of involved organs. For example, an ice bag applied to the precardia slows the heart rate, increases its force, and raises arterial blood pressure; and in case of a dilated heart, an ice bag decreases the diameter of the heart a half inch to an inch, as shown by X-ray examination. Prolonged hot applications to the pelvis, as a fomentation, a pack, or a sitz bath, relax the muscles of the bladder, the rectum, and the uterus, dilate their blood vessels, and increase the menstrual flow.

The value of massage in treating patients whose activity must be limited is better understood from the research of Ralph Pemberton, of Philadelphia, who says, "While massage partakes somewhat of the nature of exercise, studies from the chemical standpoint show that this is not wholly the case. After massage, given as vigorously as clinically practicable to individuals unaccustomed to it, there develop none of the evidences of acidosis, such as follows active exercise."

Physical medicine has been given credit for clinically producing the following results when adequately and scientifically applied to suitable cases:

1. Removing products of exudate and expediting tissue repair.
2. Improving circulatory dynamics.
3. Reducing edema due to local stasis.
4. Producing sedative effects through reduction of pain and promotion of relaxation in neuromuscular hypertonus.
5. Preserving body function in the presence of inactivity.
6. Reducing the tendency to contracture and deformity in inactivity.
7. Developing new mechanisms to compensate for lost function.
8. Preserving circulatory balance in geriatrics.
9. Through the use of fever therapy by changing the organic reaction of patients with special conditions such as chorea, C.N.S. lues, polyneuritis and neuropsychiatric cases.
10. By providing mental, recreational, and prevocational activities in post-surgical and convalescent cases.

In conclusion, it may be said that physical medicine has been clinically and experimentally demonstrated to be effective in many disease processes. When understood as to principle and skilfully applied, it is possible to replace drug therapy in some cases with physical measures which, in general, involve less incidence of side reaction and complication. Because thorough anatomical and correct physiological knowledge is essential in obtaining satisfactory results and avoiding harmful complications in using the multiple physical agencies available today, only qualified physicians should prescribe for the various forms of pathology encountered in medical and surgical practice.

335 Fourth Avenue.

XUM

NAIL CHANGES FOLLOWING THE APPLICATION OF A NAIL PREPARATION

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and
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Richmond, Virginia.

CASE REPORTS

Case 1.—A white female was first seen on May 6th, 1948, complaining of separation of some of her nails from the nail beds and a brownish discoloration of all of the finger nails. She stated that these changes were noted six weeks previously. Approximately two months prior to this visit a new type of "undercoat" (Everon) had been applied to her nails prior to the application of a nail polish.

Examination on May 6th, 1948, revealed that all of the finger nails were involved. The distal one-half of every nail presented a brownish discoloration (figure 1). In six of the nails there was

Fig. 1

a separation of the nail from the nail bed with a moderate hyperkeratosis of the nail bed (figure 2). The skin of the distal phalanges adjacent to the nails were slightly reddened.

Case 2.—White female age 48 was first seen on June 24th, 1948, complaining of painful fingernails and finger tips of approximately two months' duration. A brownish discoloration of the nails of the fourth and fifth fingers was first noted, and one week later all of the nails were involved. Some of the nails were separated from the nail beds as in case 1. The patient was aware of "a growth" under each nail. During the past month her nails had started to "buckle" and she added that "it hurts to button my clothing or open a package of cigarettes."

Examination of the nails on June 24th, 1948, revealed a discoloration of the distal one-half of the nails and a separation of some of the nails from the nail beds. There was more sub-ungual hyperkeratosis than was noted in case 1. There was more redness and tenderness of the distal phalanges. In those nails that were "buckling" the lateral margins of the nails seemed to be incarcerating themselves into the soft tissues.

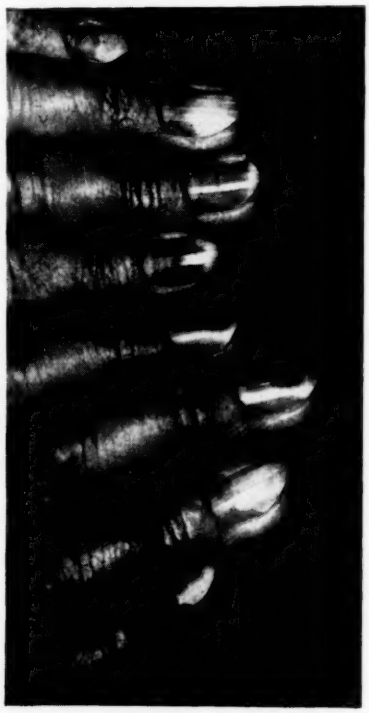

Fig. 2

Case 3.—White female age 46 was first seen on July 2nd, 1948, complaining of a brownish discoloration of the finger nails and separation of the nails from the nail beds. These changes were first noted on June 27th, 1948, after the patient had removed her nail polish. A friend of hers remarked

*From the Department of Dermatology, Medical College of Virginia.

"you have that nail infection"! The patient stated that several months ago she had used an "undercoat" known as Everon, and that for the past two months she had had her finger nails manicured at bi-weekly intervals and on each occasion this same "undercoat" was applied prior to the application of finger nail polish. She stated that on the 28th of June her finger tips were swollen and tender.

Examination on July 2nd, 1948, revealed a discoloration of the distal one-half of all of the finger nails, onycholysis of some of the nails, and a mild hyperkeratosis of the nail beds. The soft tissues of the terminal phalanges appeared to be normal.

The finger nail changes of the foregoing cases were baffling to us until we discussed them with Drs. M. B. Sulzberger and Hilliard Shair. They were kind enough to furnish us with their manuscript[1] describing similar changes due to the application of a base or under-coat.† In their cases as in ours the "undercoat" was Everon. Everon is a solution of phenol formaldehyde resins and synthetic rubbers in methyl ethyl ketone. Similar preparations under different names are on the market. The producers of Everon estimate that one million women use this preparation every week.

Sulzberger, et al, point out that this reaction of the nail bed is an unusual type of eczematous contact type of dermatitis. Their patients responded with positive patch tests to the "undercoat". They emphasized that nail changes such as onycholysis, atypical psoriasis, undiagnosed instances of subungual hyperkeratosis deserve further investigation.

In some individuals such as our first and third cases the subjective sensations were minimal while the opposite was true in the second case. It is obvicus that this type of nail change will persist if the causative agent is not removed. The nails will again return to normal after the application of "undercoat" is discontinued.

Since this manuscript was submitted, the authors have observed an additional case, showing nail changes after the application of an "undercoat".

†Base- or under-coats are applied to the nails before the polish or lacquer is put on. It is suppose to aid in making the polish go on more uniformly, stay on longer, and to prevent chipping.

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701 Professional Building.

Lists 6 Rules To Guard Children Against Polio.

Despite the lack of a definite preventive for infantile paralysis, parents may guard their children against polio by following a few simple rules, Dr. Hart E. Van Riper, of New York, says in a recent issue of *Hygeia*.

Dr. Van Riper is medical director of the National Foundation for Infantile Paralysis and at one time served as a resident in pediatrics at Children's Hospital in Cincinnati. He has been connected with the National Foundation since 1945.

Dr. Van Riper listed these safeguards:

1. Practice cleanliness.
2. Avoid new contacts.
3. Don't get overtired.
4. Avoid chilling.
5. Don't swim in polluted waters.
6. Call your doctor at once.

"These are simple safeguards, but important: especially the advice to call your doctor at the first suspicious signs. Early medical attention is the best protection parents have against infantile paralysis."

BASAL CELL EPITHELIOMA: SOME VALUABLE POINTERS GAINED IN THE SUCCESSFUL TREATMENT OF 300 CASES BY X-RAY RADIATION

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This paper is based on actual experience, using X-ray in its primitive state, when rays were generated by revolving plates cranked by hand, to the present day apparatus.

Basal cell epithelioma is the most frequent form of skin cancer. It was first described by Jacob in 1927, and for many years was known as Jacob's ulcer. Synonyms, now obsolete, are chancroid ulcer, ulcus exedens, and benign skin cancer. The term rodent ulcer is still used, but less often than formerly.

Previous to 1902 there was great confusion, both clinical and pathological, relative to cutaneous neoplasms. Krompecher separated basal cell epithelioma from other cutaneous epithelial tumors and did a great deal to clarify the situation.

Basal cell epithelioma, when of a pure type, rarely attacks the mucosa primarily. Secondary invasion of the orificial membrane is common. It is possible that the rare primary mucous membrane growths are of the mixed type, basal-squamous-cell epithelioma. The same is true of metastases. Cases such as that reported by Niles, in which a lesion at first having the histological architecture of basal cell epithelioma, must be regarded as a mixed type. Krompecher and others maintained that basal-cell epithelioma could occur primarily in mucous membranes. On the other hand, Martzloff, Lunsford and Taussig, Vinson, New and Figi, Brodus, Owen, and others have searched for such tumors in both the orificial and deep mucosa and failed to find a single case in a very large amount of material.

Basal-cell epithelioma, which is very common, is seen more often in males than in females. The sites of predilection are the head, particularly the face and the trunk, but hardly any part of the body surface is exempt. The lesions may be single or multiple.

Most pure basal-cell epitheliomas are radiosensitive. They grow very slowly, as a rule, and are easily cured by judicious and proper use of X-ray radiation. Spontaneous cure has been observed, usually as a result of ulceration and cicatrization, in very superficial cases, but such an occurrence is rare. Neglected growths may invade deep important structures and cause extensive destruction of tissue, with death from exhaustion, infection, or hemorrhage.

Clinically, depending upon the resistance or susceptibility of the tumor bed and the stage of evolution, the basal-cell epithelioma is rather polymorphous. In 1916 Hazen described a number of types, and his classification has been repeatedly modified. A clinical classification is unsatisfactory, however, because there are few definite clinical types. Most of the varieties are only temporary, one being likely to change to another over a period of years. While considerable confusion thus exists, it seems possible to recognize the following forms:

Nodular type
Ulcerous type
Papillary type
Deep type
Flat type
Cicatrizing type
Morphea-like epithelioma.

In an occasional case the affection remains superficial for many years, with slow, often irregular, peripheral extension and irregular superficial ulceration and cicatrization. Well-defined patches of various size are formed, dark red in color, with or without nodules and rolled edges. The patch may be round, oval, or configurate. It may be scaly, crusted, and nodular in places. Throughout the area is considerable cicatricial tissue. Healed areas may remain healed, but not infrequently nodules and ulcers develop in the scar tissue. This is the cicatrizing type, known also as serpiginous cicatrizing epithelioma. By many it is thought to be of the flat variety. These serpiginous cicatrizing lesions are often mistaken for syphilis and lupus vulgaris.

Ordinarily, a clinical diagnosis of basal-cell epithelioma is easily established. Occasionally it is difficult or even impossible. Regardless of clinical certainty, it is preferable to make a microscopic examination. The principal diagnostic features of

basal-cell epithelioma, in general, are: Chronicity, mother of pearl nodules, rolled edge, ulceration, absence of induration, occurrence in adult life, with perhaps a history of an antecedent lesion. Syphilis can be differentiated by its more rapid evolution, the character of the nodules, which are not the mother of pearl variety, the past history, raw ham color, positive serology, and prompt response to adequate antisyphilitic therapy.

Various therapeutic methods are in vogue for the treatment of cutaneous cancer and precancerous dermatoses as well. The method of choice is X-ray radiation for esthetic reasons; also, it is painless.

If the best results are to be obtained, the technic must be accurate. A high degree of technical skill and experience is necessary. In addition, one should possess the knowledge, judgment and ability to weigh many important factors, such as the histologic grade of the lesion, its radiosensitivity, and general clinical and morphological features.

I have had 98% of cures of basal-cell epithelioma by X-ray. Experience has taught me that better results are obtained by fractional doses of 40 R-units twice a week, carefully watched, using a 4 milliampere tube, 88 kilovolt peakes, appropriate time and distance. Have the opening in the lead large enough to show 2 centimeters of healthy skin. When you obtain a mild erythema in the healthy skin, maintain this with still smaller doses, until growth is cured. This usually takes from 8 to 12 seances. Incidentally, this same procedure has been very effective in senile and other forms of keratosis, cutaneous horns, and other precancerous conditions.

301 Court Street.

Physical Medicine in Paralysis.

Marked success in the treatment of hemiplegia, which is a paralysis of one side of the body due to brain hemorrhage, through the use of physical medicine is reported by Comdr. Edward W. Lowman (MC), U.S.N., of the Department of Physical Medicine, U.S. Naval Hospital, Philadelphia.

Writing in the May 29 issue of *J.A.M.A.*, Comdr. Lowman reports that out of 18 chronic cases of paralysis due to brain hemorrhage, 12 learned to walk again after undergoing an intense program of physical medicine for 118 days, while three showed definite improvement. There was no improvement in the condition of the remaining three. In 10 additional new cases, nine of the patients learned to walk again after 67 days of treatment, and improvement was noted in the other patient.

Commenting on the results of the treatment, Commander Lowman says that "the early, intensive and intelligent use of physical medicine, with emphasis on therapeutic reconditioning exercises, assures a potentially good prognosis in the rehabilitation of patients with uncomplicated hemiplegia."

The program of rehabilitation employed by the Navy doctor was begun from two to four weeks after the onset of the acute illness. The first stages included massage, application of heat and therapeutic baths, followed by active exercises in bed when voluntary motion was possible. Efforts to learn to walk again were begun early, usually within two to eight weeks after treatment was started. This was a gradual process, beginning with sitting up in bed and placing the feet on the floor from the bedside, and concluding with exercises in the gymnasium. The gymnastics program, which was conducted under the supervision of a trained physical therapist, consisted at first of simple mat exercises and ultimately of more difficult ones on bars, stationary bicycles and other devices.

This program varied somewhat for each patient, depending on his physical and mental condition.

According to Commander Lowman, the greatest factor in the success of the rehabilitation treatment is "cooperation on the part of the patient, fostered by his desire to regain his independence."

XUM

DIABETES INSIPIDUS

A. B. GRUBB, M.D.,
Cripple Creek, Virginia.

The following case is of a 33 year old man, 6 feet and 6 inches tall, who possibly through life has had too much of the anterior pituitary hormone. Recently, without any apparent injury to the posterior pituitary lobe, but evidently due to a degeneration, he developed a severe case of diabetes insipidus. The color and specific gravity was not much more than spring water and the amount daily was well between six and eight gallons. The patient was weak and suffered from thirst. He voided every hour of the night and loss of sleep was distressing.

He was as soon as possible put on pitressin tannate and one ampoule each 24 hours proved to be sufficient. This was given about an hour before bedtime so that it would get in its strongest effect at night.

The symptomatic results from the first were gratifying and were indeed spectacular. The patient rested all night long, and his output of urine became normal. Specific gravity went up to about 1015.

Pituitrin (Obs.) proved to be a poor substitute for pitressin tannate. The effect wore off in about five hours and the patient got no rest after about 3 A. M.

The future plan for this patient is for a transplantation of a posterior pituitary lobe into any part of his body, say under the rectus muscle, when one can be obtained. This, it seems, should at least be worth a trial.

Surgery for Facial Paralysis.

Several technics for the surgical repair of facial paralysis are described by Paul W. Greeley, M.D., Chicago, in the current issue of the *Archives of Surgery*, published by the A.M.A.

Facial paralysis may result from injury to the seventh, or facial nerve. According to Dr. Greeley, the best method of repair involves surgery of the injured nerve, with the intention of permitting the face to gain motion again. This may include the sewing together of the ends of the lacerated nerve trunk or the grafting of part of one nerve to another to fill in a gap if the injury has made one.

The uniting of one nerve to another, which has been used several times in the treatment of facial paralysis, is undesirable, the report says, because "the associated movements involved in trying to move the facial muscles are awkward and frequently more conspicuous than the original facial paralysis." When nerve surgery cannot be undertaken, the article says that "the simplest and most satisfactory plastic surgical correction is obtained by supporting the paralyzed face with strips of autogenous fascia lata [a fibrous tissue surrounding the muscles of the thigh]." This procedure involves transplanting the strips of tissue under the skin from the muscle of the temple, down the side of the face and to the muscle underneath the lip.

This in itself will not make the face active again, as in the nerve surgery procedures, but will improve the appearance of the patient and increase his comfort. Some activation may be obtained, however, by supplementing the fascia lata operation with one of the muscle transplanting procedures.

According to Dr. Greeley, the ultimate success or failure of these plastic surgical operations "depends largely on the intelligence of the patient and his willingness to practice movements of facial expression before a mirror until he has educated himself on how to utilize the muscles in their new locations."

XUM

PUBLIC HEALTH

L. J. ROPER, M. D.,

State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for June 1948, as compared with the same month in 1947, and for the period of January through June 1948, compared with the same period in 1947, is as follows:

	June 1948	June 1947	Jan.-June 1948	Jan.-June 1947
Typhoid and Paratyphoid	9	11	62	42
Diarrhea and Dysentery	251	865	1,644	2,676
Measles	1,301	935	5,493	7,009
Scarlet Fever	55	60	562	820
Diphtheria	19	12	118	137
Poliomyelitis	10	3	20	17
Meningitis	6	9	51	63
Undulant Fever	8	4	47	29
Rocky Mountain Spotted Fever	17	13	22	20
Tularemia	5	3	29	31

POLIOMYELITIS 1948

Much interest and concern has developed throughout Virginia because of marked increase in the prevalence of poliomyelitis in North Carolina. Exact record of total cases is not available at this time; however, it appears that in excess of 500 cases have been reported through July 12th. These reports indicate concentration of cases from eastern central, central and western sections of the state with scattered cases elsewhere. It is interesting to note that to a large extent the greatest prevalence is reported in those counties in which concentration occurred during the 1944 outbreak.

In Virginia the prevalence of poliomyelitis has not as yet materially increased. Largely, distribution of cases is scattered with the exception of 11 cases which have appeared in June and July in the Hampton Roads area. During 1947 a total of 173 cases were reported with 17 of these occurring during the first six months of the year. Nineteen cases have been reported during a similar period in 1948 and 12 additional cases to date during July. The average record over a 38 year period of report for the month of July shows an average of 30.9 cases. During the last outbreak years of 1944 and 1945 there were reported respectively 756 and 335 cases or a total of 1091. Since poliomyelitis incidence tends to increase in four to six year cycles, it may not reasonably be expected that morbidity should be high during this year. It must be stated, however, that since prevalence is high in North Carolina the cyclical tendency theory may not apply and another year of high prevalence might develop in Virginia.

The State Health Department is concerned with poliomyelitis developments in North Carolina and is carefully watching the situation in Virginia. Preliminary arrangements have been made to provide all accepted control measures and facilities for diagnosis and treatment of the patient. The department is cooperating with the Infantile Paralysis Foundation Chapters throughout the State and this organization, as in the past, is in the position to render material assistance. In order that the state and local health departments may provide maximal levels of service to physician and patient it is requested that all new cases of poliomyelitis be reported by telephone or telegraph, collect, immediately following diagnosis. Report may be made to the local health department in those areas with organized public health facilities. In other counties and cities report should be made directly to the State Health Department. To this end the cooperation of physicians and hospitals will be much appreciated. News releases are being provided daily. Through this means the number and distribution of cases is made available to those interested. From time to time additional information will be released as to program developments and general advice to the public. The normal precautionary measures to be taken are listed in the booklet (The Control of Communicable Diseases) as issued to all reporting physicians in Virginia during 1948.

MEDICAL SOCIETY OF VIRGINIA

PUBLIC RELATIONS

HENRY S. JOHNSON, *Director*

Work With The Press

The three columns of health and medical care information—"Test Your Medical IQ", "Health Talks" and "It's Your Health"—are now being supplied regularly to those papers which have requested them. Format and type for these are identical, thus adding a distinctive touch and making the columns easily recognizable for readers.

One other paper has been added to the mailing list, making a total of 47 weeklies or afternoon dailies now participating.

This office would be glad to send samples of these columns to any doctor who may be in position to pass them on to a local editor who is not now using them.

Radio Programs

Radio station WTAR in Norfolk has been placed on the list of stations in this year's "Tell Me Doctor" series, and will broadcast the program at 8:55 each Sunday evening.

Four other stations — WOPI - FM in Bristol, WBTM in Danville, WLVA in Lynchburg, and WINC in Winchester—are using these transcriptions five times weekly.

Veterans Medical Care Program

There are now three separate committees functioning in connection with the Veterans Medical Care Program in Virginia.

The Fee Schedule Committee, whose work may have been completed, set up the initial schedule of fees for the program. Members of the Committee are Drs. J. M. Emmett, Chairman, W. G. Crutchfield, G. A. Duncan, J. R. Gorman, H. B. Mulholland and A. F. Robertson.

The Committee on Applications, headed by Dr. J. R. Massie, serves in final processing of applications sent in by Credentials Committees of local Medical Societies. Other members are Drs. Allen Barker, Edward E. Haddock, A. Brownley Hodges and Oscar Swineford.

Drs. Patrick H. Drewry, Jr., Chairman, R. D. Butterworth, Guy W. Horsley, Elam C. Toone, Jr. and Fletcher J. Wright, Jr. constitute the Veterans Affairs Committee, sometimes referred to as a Review Board. In many other states, it was found that such a committee was valuable in settling problems and ironing out unforeseen difficulties arising in the functional program. The work of this Committee is construed to be especially important in view of the fact that, in the program in Virginia, doctors will deal directly with the Veterans Administration instead of through the State Society, as is the case in some other states.

BOOK ANNOUNCEMENTS

Correlative Neuroanatomy. By JOSEPH J. McDONALD, M.S., M.Sc.D., M.D.; JOSEPH G. CHUSID, A.B., M.D.; and JACK LANGE, M.S., M.D. Fourth Edition, Revised. 60 Illustrations. University Medical Publishers, Palo Alto, California. 1947. 156 pages. Illustrated. Paper. Price $3.00.

The Healthy Hunzas. By J. I. RODALE. Rodale Press, Emmaus, Pennsylvania. 1948. 263 pages. Illustrated. Price $2.75.

War, Politics, and Insanity. By C. S. BLUEMEL, M.A., M.D., F.A.C.P., M.R.C.S. (Eng.) The World Press, Inc., Denver, Colorado. 1948. 121 pages. Cloth. Price $2.00.

Pioneer Life in Kentucky. 1785-1800. By DANIEL DRAKE, M.D. Edited from the original manuscript, with introductory comments and biographical sketch by EMMET FIELD HORINE, M.D. Henry Schuman, New York. 1948. xxix-257 pages. Illustrated. Cloth. Price $4.00.

Practical Bacteriology, Hematology, and Parasitology. By E. R. STITT, M.D., Ph.M., Sc.D., LL.D., Rear Admiral, Medical Corps, and Surgeon General, U. S. Navy, Retired; etc.; PAUL W. CLOUGH, M.D., Physician-in-Charge of the Diagnostic Clinic, Johns Hopkins Hospital; and SARA E. BRANHAM, M.D., Ph.D., Sc.D., Senior Bacteriologist, National Institute of Health; etc. Tenth Edition. The Blakiston Company, Philadelphia. 1948. 991 pages, 765 illustrations, and color plates. Cloth. Price $10.00.

How Laymen Cut Medical Costs. Public Health Institute, Chicago. 1948. 35 pages. Cloth.

Handbook of Ophthalmology. By EVERETT L. GOAR, A.B., M.D., F.A.C.S., Professor of Opthalmology, Baylor University College of Medicine, Houston, Texas. 166 pages. With 48 text illustrations and 7 color plates. Cloth. Price $5.50.

Textbook of Gynecology. By EMIL NOVAK, M.D., F.A.C.S., Assistant Professor of Gynecology, The Johns Hopkins Medical School; Gynecologist, Bon Secours and St. Agnes Hospitals, Baltimore. Third Edition. Baltimore, The Williams and Wilkins Company. 1948. xi-742 pages. Illustrated. Cloth. Price $8.00.

The exhaustion of the second edition of this authoritative work on gynecology and female endocrinology for gynecologists and general practitioners has given Dr. Novak an opportunity of making many minor changes and a few major additions including new illustrations, some of which are in color. The illustrations are excellent and those illustrating histological changes speak with authority because of the author's tremendous experience. I was interested in his discussion of habitual abortion. It may be due to deficient germ plasm or to a deficiency of progesterone. In the former no amount of treatment can save the present pregnancy. The patient and her husband should be treated for any demonstrable endocrinopathy such as hypothyroidism and measures should be taken to improve the general health. The author is noncommital on the value of vitamine E. When the abortion is due to deficiency in progesterone much can be done. The administration of progesterone is logical in such cases and the combination of estrogen and progesterone as recommended by Vaux and Rakoff is most promising. This has certainly been the reviewer's experience.

M. P. R.

Advances in Military Medicine. Science in World War II. Office of Scientific Research and Development. Made by American Investigators Working Under the Sponsorship of The Committee on Medical Research. Edited by E. C. Andrus, D. W. Bronk, G. A. Carden, Jr., C. S. Keefer, J. S. Lockwood, J. T. Wearn, M. C. Winternitz. An Atlantic Monthly Press Book. Little, Brown and Company, Boston. 1948. Volume I—liv-472 pages. Volume II—xvii-pages 473-900. Illustrated. Cloth. Price of two volumes $12.50.

These two volumes, compiled by the Committee on Medical Research, are part of a larger series published under the general title "Science in World War II", and constituting at least a partial record of the accomplishments of the Office of Scientific Research and Development. The totality of modern warfare is nowhere better demonstrated than in the totality of effort it demands of those who participate in any branch of the service. That medicine is no exception is evident from the subjects covered in the various papers here brought together.

The general topics include: Medicine, Surgery, Aviation Medicine, Physiology, Chemical Warfare, Anti-pest Agents, Malaria, and Penicillin. Under each of these headings are grouped a number of papers dealing with special problems. These are generally synoptic in nature; taken as a whole they are concise and readable. Individually, of course, they vary in interest and importance, but all represent a high order of scientific endeavor and accomplishment. Detailed criticism must be within the province of experts in the various fields.

Much of the material, most of it, in fact, carries over from military to civilian medicine with no diminution of importance. In peace as in war, such matters as shock, wound healing, antibiotics and malaria retain their interest. The chief criticism to be offered against these volumes is that they are too compressed, that they cover only a fraction of the work done by investigators on contract with the Committee on Medical Research, the list of whose publications covers nearly eighty pages. But for those who seek access to brief reviews of the most outstanding work and that of most general interest these are useful books, either for reference or just for browsing. The work they summarize is an interesting evidence of the extent to which medical resources can be mobilized in a free country when the occasion arises.

H. S. TALBOT

EDITORIALS

The Ninety-Seventh Annual Session of the A.M.A.

THE week of June 21st was a busy time for the 12,000 fellows of the American Medical Association who attended the annual session in Chicago. The final figures of the registration were expected to come within a thousand of the attendance last year at the Centennial Session at Atlantic City. The annual meetings have become such huge affairs that only three places in the country, Chicago, Atlantic City and San Francisco, have facilities for handling them. A commendable innovation this year, was the publication in the *Daily Bulletin* each morning of a summary of the scientific program for the day. It showed in tabulated form what was going on, morning and afternoon, in rooms 1, 2, 3, 4, 5, and 6 of the Navy Pier, Thorne Hall, the Ballroom and the Boulevard Room of the Sheraton Hotel, and the Assembly Room of the A.M.A. Building, as well as what was on television. Operations and Clinics of the Northwestern University School of Medicine could be viewed by some 1500 persons at the three stations by means of television. This service was made available by the co-operation of Northwestern University; the American Medical Association, the Radio Corporation of America, Passavant Hospital, and E. R. Squibb and Sons. The operation that caused the most comment was a cesarean section, in which the baby resisted resuscitation methods for some nine minutes.

The scientific and commercial exhibits were strung out for a country mile along the Navy Pier. Between the two was interposed the very beautiful showing of the American Physicians Art Association. The exhibits on atomic energy were outstanding. Experts were on hand to explain isotopes, heavy water and various forms of Geiger counters. There were demonstrations of the use of radioactive isotopes in experimental medicine. The Department of National Defense had an arresting display depicting the damage to animate and inanimate objects by atomic bomb explosions and the means that have been developed to aid a strickened community. The special exhibit of fresh pathologic material was unusually interesting. Each morning pans of fresh organs from the autopsy rooms of Chicago were put out on display for demonstration. We remember particularly some beautiful lesions of infantile scurvy. The exhibit of J. F. Herrick and E. J. Baldes of the Mayo Foundation, on ultrasonics in medicine "made" the Chicago newspapers, and the reporters dilated on the possibility of these high frequency sound waves destroying cancer tissue.

The second afternoon of the general scientific meetings was devoted to a discussion of atomic energy and medicine. Dr. Henry R. Viets was chairman. Mr. Lewis L. Strauss, formerly of Richmond but now with the Atomic Energy Commission in Washington, explained the legal setup of the Commission and the need for Federal control with the supervision of scientists. Dr. Paul Aebersold of Oak Ridge spoke on "The Isotopes and Medicine". At first the supply of these substances was limited, but now there is an abundance. The chief difficulty now is a dearth of technicians trained in this field and the special apparatus that is necessary. The Commission is anxious to have as wide a use of the isotopes as possible. He showed maps indicating the laboratories now using isotopes and gave figures of the shipments to these places.

Some had been sent to foreign countries. Dr. Joseph G. Hamilton of Berkeley, California, spoke on isotopes and internal radiation. Some of the heavy isotopes have a radio activity that lasts for years. Should some of these be absorbed and become located in bone tissue, they would play havoc with the bone marrow. The way they gain access to the body is through wounds, and no person with cuts or abrasions of the skin is allowed to work with them. The isotopes of lesser atomic weight have a short "half life" and can be used as tracers in the study of circulation and of metabolism. Dr. Stafford L. Warren of Los Angeles recounted his experiences in Hiroshima and Nagasaki. He went to Japan right after the bombing and studied the survivors. He gave a splendid clinical description of the radiation effects. Finally, Dr. Shields Warren, of Boston, discussed the medical program of the Atomic Energy Commission.

It was physically impossible, of course, to attend many of the section meetings. We attended all the sessions of the Section on Obstetrics and Gynecology. Goodrich C. Schauffler gave an interesting account of Obstetrics and Gynecology in China. Anemia is prevalent in China and yet the Chinese women stand blood loss without serious shock, which he explained by the fact that they have a much greater complacency than Western women, which is indeed fortunate, as blood for transfusion is available only to the wealthy. There was a panel discussion on endometriosis. The moderator, Joe V. Meigs of Boston emphasized the danger of postponing childbearing until late in life. He thought it would be wise to subsidize our young people so that they could afford to begin their families early rather than have them postpone pregnancy to a time when they could financially afford to have children. In the panel discussion on obstetric hemorrhage, the danger of infecting the patient with virus hepatitis by using pooled plasma, was stressed. The statement was made that 8 per cent of the population have asymptomatic hepatitis and that a patient receiving pooled plasma stood a 1 to 20 chance of developing homologous serum jaundice, which in itself carried a considerable mortality. This risk should be weighed against the immediate risk when faced with the need of using plasma when whole blood is not immediately available. The panel discussion on fetal anoxia at birth and cyanosis of the newborn was staged by both pediatricians and obstetricians. Several new terms were introduced. Dr. Clifford spoke of the yellow vermix syndrome which occurred when there was intrauterine distress. He also spoke of vermix edema of the lungs, a condition that clears up in three days under oxygen therapy. Dr. Zielzer showed pictures of the lungs with vermix membrane.

One of the most interesting papers of the joint session of the sections on pediatrics and obstetrics and gynecology was Dr. E. L. Kendig's report of two cases of Rh negative mothers who by history and every laboratory test should have continued to have erythoblastotic babies. For this reason abortion was advised in each case. This was refused and both mothers had normal healthy Rh negative babies.

It is with great pleasure that we note the election of Dr. Walter B. Martin of Norfolk to the Board of Trustees and Dr. Henry B. Mulholland of Charlottesville as a member of the Council on Medical Service. We are also pleased that Dr. Ernest E. Irons is the new President-Elect of the Association. The interim session will be held in St. Louis, November 30th to December 3rd.

XUM

The Cornelian Corner

THE June number of the *Journal of the Michigan State Medical Society* has an interesting article by Dr. Leo H. Bartemeier about a new society. The Cornelian Corner is a mental hygiene project which aims to promote better parent-child relationships. It was started in 1942 in Detroit by a pediatrician and a psychiatrist. The pediatrician was preoccupied with the difficulties which so many mothers experienced in connection with feeding and the care of their infants. In his effort to solve this problem he had broken with the orthodox procedures and had advised the mothers to feed their infants as often as they seemed to want nourishment and to let them have as much as they would take. The psychiatrist was concerned with severe mental disorders which stemmed from babyhood. He saw in the improved mother-child relationship a possibility of lessening the incidence of serious mental disorders of adult life. The intriguing name "Cornelian Corner", is derived from two sources: *Cornelian,* from the Roman matron who was famous for her pride in her children, and *Corner,* the place in the combination kitchen-living room where the old fashioned mother went to suckle her infant. She turned her back on the world and nursed her baby in peace and contentment.

The membership of the organization consists of pediatricians, obstetricians, nurses, chinical psychologists, nutritionists and such like. Article II of their constitution reads as follows: "*Purpose*—Believing that a program aimed at relief of the cultural tensions so frequently incident to feeding, toilet training, and child discipline, represents the nuclear approach to the problem of mental hygiene, we dedicate ourselves to such a program.

"The purpose of this association, therefore, shall be to promote healthy parent-child relationships.

"We will strive toward the achievement of the objective:

"1. Through research in the fields of child development and family life.

"2. Through the education of parents, especially expectant mothers and fathers, as to the basic needs of the developing child.

"3. Through the wide promulgation to professional groups of all pertinent information regarding the developing child and his environmental needs.

"(a) We will strongly advocate the abandonment of the artificial practice of separating the new born child from his parents.

"(b) With the conviction that it is advantageous to both mother and child, we will encourage the breast feeding of infants with opportunity to nurse whenever the infant is hungry or anxious."

Francis Henney Smith, 1881-1948

ON July 1st at his home in Abingdon, death came unexpectedly to Dr. Frank Smith, an ex-president of the Medical Society of Virginia and a leader in Southwest Virginia. Dr. Smith had been in poor health for several years, but was improving. When he attended the meeting of the Society last October he took an active part in the proceedings as was usual with him.

Francis H. Smith was born in Lexington, Virginia, April 12, 1881, a year noteworthy in medical annals for many other things. It was the year in which Leveran discovered the plasmodium of malaria and Koch his method of making plate cultures of bacteria. The following year Koch discovered the tubercle bacillus. Frank Smith was the son of the Rev. James Henderson Smith and Natalie Friend Smith. He was named for his grandfather, Gen. Francis H. Smith, the superintendent of the Vir-

ginia Military Institute. His father was a noted Presbyterian minister. In spite of this military and ecclesiastic background, Frank Smith always wanted to be a physician, an inspiration he received in his boyhood from the family doctor. With this in mind, he matriculated at Fredericksburg College where he graduated in 1899. He graduated in medicine at the University College of Medicine of Richmond in 1904. After an interneship at St. Luke's Hospital in Richmond, he located in Lewisburg, W. Va. He was engaged in the practice of medicine in this beautiful Greenbrier Valley, when in 1910 he was invited by Dr. George Ben Johnston and Dr. A. Murat Willis to take charge of a hospital they were starting in Abingdon. This hospital developed into the medical center for Southwest Virginia, and upon Dr. Johnston's death it became the George Ben Johnston Memorial Clinic. Except for an interval in World War I, when he was a medical officer, practically all Dr. Smith's professional life was devoted to the hospital in Abingdon. He was a fellow of the American College of Physicians, the American Medical Association and the Southern Medical Association. Since 1937 he has been a diplomate of the American Board of Internal Medicine. He was an ex-president of the Southwestern Virginia Medical Society. Dr. Smith represented the Ninth District on the Council of the Medical Society of Virginia for many sessions and was vice-president of the Society on several occasions, and in 1934-5 he was its president. For many years he was a member of the State Board of Medical Examiners and did yeoman service in that capacity.

Dr. Smith's achievements in the field of medicine did not preclude his interest in civic enterprises. He was the president of the Washington County National Bank and a past president of the Abingdon Rotary Club. He is survived by his wife and two children, a son and a daughter, and by four brothers, two of whom, James Henderson Smith and Philip Stephenson Smith, are well known physicians and members of the Medical Society of Virginia. He will be sadly missed in the deliberations of the Society and by his family and friends in Southwest Virginia.

SOCIETIES

The Buchanan-Dickenson County Medical Society

Held its regular monthly meeting at Grundy on June the 17th, with eleven physicians attending. After a business session at which time delegates and alternates were named for the State meeting, two moving pictures were shown—Iwo Jima, and the Battle of the Antarctic. Officers of this Society for 1948 are: President, Dr. J. P. Sutherland, Harman; vice-president, Dr. C. F. Johnston, Grundy; and secretary-treasurer, Dr. T. C. Sutherland, Haysi.

The Wise County Medical Society

Was entertained by the Appalachia and Big Stone Gap doctors at a banquet at the Monte Vista Hotel, Big Stone Gap, June 16th. At the business session, delegate and alternate to the State meeting were elected. Dr. Daniel D. Chiles, Radford, spoke on Therapeutic Procedures in Psychiatry Adaptable to General Practice, and Mr. Henry S. Johnson, director of Public Relations of the Medical Society of Virginia, spoke on Public Relations.

On August 18th, the Society will be guests of Drs. S. H. Rivers and J. H. Hagy, Abingdon, Dr. J. D. Culbertson, Coeburn, and Dr. Tudor, Norton, at the Hotel Norton.

Dr. C. H. Henderson is president of this Society and Dr. T. J. Tudor, secretary.

The Fauquier County Medical Society

Met in Warrenton on June 17th, and the following officers were unanimously re-elected: President, Dr. V. L. McCullers, Remington; vice-presidents, Drs. H. L. Townsend, Marshall, and W. G. Trow, Warrenton; and secretary-treasurer, Dr. J. Frank Folk, Warrenton. Delegate and alternate to the State Society meeting were also named.

XUM

NEWS

Annual Meeting, Medical Society of Virginia.

Plans are shaping well for the 101st meeting of the Society to be held in Richmond, October 18, 19 and 20, under the presidency of Dr. Guy R. Fisher of Staunton. To expedite business affairs and permit larger attendance at scientific sessions, it has been decided to have the Council meet on Sunday afternoon, the 17th, with the first meeting of the House of Delegates at 8:00 that evening.

In addition to addresses by the President's guests, there will be a panel discussion on Medical Care on Tuesday afternoon. It is hoped that motion picture films may be shown also, during the meeting and there will be luncheon or dinner meetings of special societies and alumni of the two Virginia schools. To avoid the implications of the old adage "All work and no play", there will be a banquet and special entertainment on Tuesday evening.

Make your hotel reservations now and help add to the success of the meeting by your attendance.

Fifty Year Awards.

Plans are now being made to honor those members of the Medical Society of Virginia who have been in practice for fifty years or more, and Dr. Wyndham B. Blanton was appointed by Dr. Fisher to make arrangements for appropriate recognition.

A number of other state societies, including Alabama, New York, Illinois, Indiana and Wisconsin, have instituted such awards, and their methods have been reviewed in an effort to select the best features that have been suggested.

It has been decided that the year of graduation from medical school would be used as a basis on which to determine length of service. In other words, graduates of 1898 or before would be eligible for fifty year awards during 1948. A list of these members is being prepared and the help of secretaries of local societies will be enlisted in its preparation.

The annual meeting of the Society in Richmond from October 18 through 20 has been selected as an appropriate time for the ceremony, at which certificates will be presented.

Further announcement on this subject may be expected.

American Medical Association.

At the 97th annual session of the Association held in Chicago from June 21-25, there was a registration of 11,963 Fellows, and with the doctors' wives and guests, exhibitors, and members of their families, etc., there was a total registration of nearly 22,000. Dr. R. L. Sensenich, South Bend, Indiana, succeeded Dr. Edward L. Bortz, Philadelphia, to the presidency, and Dr. Ernest Edward Irons, Chicago, was named president-elect. Other offices filled by the House were: Vice-President, Dr. Roy W. Fouts, Omaha; secretary, Dr. George F. Lull, Chicago (re-elected); treasurer, Dr. Josiah J. Moore, Chicago; speaker, Dr. Francis F. Borzell, Philadelphia; and vice-speaker, Dr. James R. Reuling, Bayside, N. Y.

Dr. Walter B. Martin, Norfolk, was elected to the Board of Trustees to fill the unexpired term of Dr. C. W. Roberts of Atlanta until 1951.

Dr. H. B. Mulholland, Charlottesville, was elected to the Council on Medical Service. He and Dr. J. M. Hutcheson were delegates from the Medical Society of Virginia.

The 1949 session of the A. M. A. will be held in Atlantic City, June 6-10, but the second annual interim meeting will be in St. Louis, November 30 to December 3, 1948.

Re-Appointed State Health Commissioner.

Dr. L. J. Roper has been re-appointed by Governor Tuck to a new four-year term as State Health Commissioner. He was first appointed to this position two years ago to fill the unexpired term of Dr. I. C. Riggin who resigned to return to private practice in Suffolk.

News from State Health Department.

Dr. H. D. Crow has been appointed Health Director of the Fredericksburg-King George-Stafford Health District, effective July 1. Dr. Crow has just completed his graduate work and received the degree of Master of Public Health at Johns Hopkins.

Dr. M. V. Bemis has resigned as Health Officer of the Buchanan-Tazewell Health District, effective July 1.

Miss Mary I. Mastin, who had served as Director of the Bureau of Public Health Nursing since January 1, 1932, resigned effective July 1. Her

successor is Miss Hazel Higbee, former professor of Public Health Nursing at the Medical College of Virginia.

Dr. W. H. Rumbel has recently been appointed Director of the Division of Mouth Hygiene. Dr. Rumbel comes to Virginia from West Virginia where he was Director of the Bureau of Dental Hygiene in the State Health Department there. Dr. George A. Nevitt, Dental Consultant of District Number 2 of the U. S. Public Health Service, has served in this capacity temporarily on loan from that service.

Dr. W. A. Browne, Director of the Bureau of Communicable Diseases, has resigned, effective August 1. Dr. Browne will become City-County Health Director of Evansville, Indiana.

Dr. Samuel D. Sturkie, former Lynchburg Health Director, has taken office as director of the Charlottesville-Albemarle Health Department.

Miss Estelle Marks has been appointed as State Registrar of Vital Statistics. She has been serving as acting registrar since the death of Dr. W. A. Plecker.

Officers of State Board of Medical Examiners.

At the meeting of the Board in June, Dr. Guy W. Horsley, Richmond, was named president; Dr. C. L. Riley, Winchester, vice-president; and Dr. K. D. Graves, Roanoke, re-elected secretary-treasurer.

Dr. O. L. Huffman,

Class of '38, University of Virginia, who formerly practiced at Arvonia, has located at Marshall where he is associated with Dr. Henry L. Townsend. Dr. Huffman has been elected to membership in the Fauquier County Medical Society and also to the staff of the Physicians' Hospital at Warrenton.

Johnston-Willis Hospital Completes New Addition.

The new 75-bed addition to Johnston-Willis Hospital, Richmond, has been opened for use and has been named Tompkins Pavilion in memory of the late Dr. James McCaw Tompkins. This addition increases the hospital capacity to 225 beds and makes it the largest private hospital in the State. The wing is located back of and parallel with the main hospital building with which it is connected by a long brick corridor. The basement houses an emergency room and out-patient department; the second and third floors are given over to obstetrical patients; and the first floor is for general work.

New Films Available.

The first of a series of scientific motion picture films on various phases of endocrinology was recently released by Schering Corporation, Bloomfield, New Jersey. The subject of this film is "The Physiology of Normal Menstruation". This is completely animated in color and available with or without sound. It may be obtained free of charge for showing before interested groups by writing to the Medical Service Department of Schering.

Wyeth announces the availability of a new film "The Use of Digitalis in Heart Failure". It is 16 millimeter, with sound and color; 1200 feet, with a showing time of approximately 35 minutes. It may be obtained from the Wyeth Incorporated Film Library, 1600 Arch Street, Philadelphia 3.

Richmond Health Department Changes.

Dr. Paul W. Bowden, recently director of the school health program in Arlington County, has been appointed as chief of communicable and venereal disease control for the Richmond Department of Public Health. He held the position as director of communicable disease control for this department from 1942 to 1944.

Dr. L. D. Policoff has been appointed as head of the new medical service program for city employees. This service will provide first aid for city workers who become ill or are injured while on duty; preemployment physical examinations; and nurse visits for a worker who is absent because of sickness.

Married.

Dr. Willis M. Sprinkle, Marion, and Miss Irma Chappell, Miami, Florida, June 27th.

Dr. Claude Gibson Hooten, Jr., Lynchburg, and Miss Martha Anne Jackson, Dade City, Florida, June 20th.

New Coroners Appointed.

Dr. Herbert S. Breyfogle, chief medical examiner of Virginia, has announced the following new appointments: Drs. C. L. Coleman and Ernest B. Carpenter as additional coroners for the City of Richmond; Dr. John M. Ratliff as coroner of South Norfolk and Norfolk County to succeed Dr. L. C. Ferebee, resigned; Drs. D. E. Watkins and S. G. Saunders as coroners of Waynesboro; Dr. Guy C.

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Richardson for Bristol; Dr. W. S. Nicklin, Jr., for Fauquier County; and Dr. N. P. Snead, Cartersville, for Cumberland and to serve also in Powhatan and Goochland Counties; Dr. E. R. Grether for Alexandria; Dr. B. J. Atkinson for Greenesville County; Dr. R. M. Shelton for Spotsylvania County; and Dr. C. D. Moore for Wythe County.

News From Jefferson Medical College.

Dr. Joseph O. Crider, Assistant Dean, has been promoted to Professorship in Physiology. He was serving as an Assistant Professor in the Physiology Department at the time of his promotion to Professorship. Dr. Crider is an alumnus of the University of Virginia.

Dr. Nicholas A. Michels has been promoted from an Associate Professor in the Anatomy Department to Professorship in Anatomy.

Dr. Andrew Jackson Ramsay has been promoted from Associate Professor to Professorship in Histology and Embryology.

Dr. Peter A. Herbut has been promoted to Professorship in Pathology. He succeeds Dr. Virgil Holland Moon who retired at the end of this School year. He was serving as an Assistant Professor in the Pathology Department at the time of his promotion to Professorship.

Dr. George Allen Bennett has been promoted to Professorship in Anatomy and Director of the Daniel Baugh Institute of Anatomy of the College, succeeding Dr. J. Parsons Schaeffer, who retired at the end of this school year, June 1948.

Dr. Clarence S. Livingood, has been appointed to Professorship in Dermatology. He is succeeding Dr. Frank Crozer Knowles whose retirement becomes effective at the end of the school year. Dr. Livingood served as Assistant Professor of Dermatology and Syphilology at the University of Pennsylvania.

Gill Spring Graduate Clinic.

The Twenty-Second Annual Spring Graduate Course will be held April 4-9, 1949 at the Gill Memorial Eye, Ear, and Throat Hospital, Roanoke.

Among the guest speakers for the meeting, there will be:

Dr. W. W. Eagle, Durham, N. C.
Dr. A. C. Jones, Boise, Idaho
Dr. E. P. Fowler, Jr., New York
Dr. J. S. Lundy, Rochester, Minn.
Dr. Henry Williams, Rochester, Minn.
Dr. E. W. Sheldrup, Iowa City, Iowa
Dr. Carl C. Johnson, Boston
Dr. Bernard Samuels, New York
Dr. W. B. Clark, New Orleans
Dr. Banks Anderson, Durham, N. C.
Dr. Glen G. Gibson, Philadelphia
Dr. Harold Brown, New York

Dr. C. H. Henderson,

Norton, announces the opening of an Orthoptic Clinic in conjunction with his practice of Ophthalmology. The technician in charge will be Miss Ruby Hall who has just completed a nine months training course at the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital, Baltimore.

Dr. Hack U. Stephenson, Jr.,

Is now located at the Veterans Hospital, Swannanoa, North Carolina. He has recently been at Kecoughtan, Virginia.

Dr. W. R. Chitwood,

For the past year at Clifton Forge, is now located in Wytheville with office at the Chitwood-Moore Clinic.

The American Congress of Physical Medicine

Will hold its twenty-sixth annual scientific and clinical session Sept. 7-11 inclusive, at the Hotel Statler, Washington, D. C. All sessions will be open to members of the medical profession in good standing with the American Medical Association. The annual instruction courses will be offered in two groups. One set of ten lectures will be based primarily on physics and physiology and attendance will be limited to physicians. One set of ten lectures will be more general in character and will be open to physicians as well as to physical therapists. Full information may be obtained by writing to the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

Dr. John R. Kight,

Norfolk, announces the removal of his office to 1204 Colonial Avenue, where he will limit his practice to obstetrics and gynecology.

Dr. Harry W. Hollingsworth,

Formerly of Derby, more recently of Sebring, Fla., is now located in Breckenridge, Texas, where he is engaged in general practice with special attention to obstetrics.

Dr. Emmett V. Richardson.

Since his release from the Army two years ago, Dr. Richardson has been taking post-graduate work in Ear, Nose and Throat at the University of Pennsylvania and Episcopal Hospital, Philadelphia. He will re-open his office in Marion about August 1st with his practice limited to Eye, Ear, Nose and Throat.

Research Fellowships.

The American College of Physicians announces that a limited number of Fellowships in Medicine will be available from July 1, 1949-June 30, 1950. These Fellowships are designed to provide an opportunity for research training either in the basic medical sciences or in the application of these sciences to clinical investigation. They are for the benefit of physicians who are in the early stages of their preparation for a teaching and investigative career in Internal Medicine. Assurance must be provided that the applicant will be acceptable in the laboratory or clinic of his choice and that he will be provided with the facilities necessary for the proper pursuit of his work. The stipend will be from $2,200 to $3,200.

Application forms will be supplied on request to The American College of Physicians, 4200 Pine Street, Philadelphia 4, Pa., and must be submitted in duplicate not later than November 1, 1948. Announcement of the awards will be made as promptly as is possible.

Dr. W. W. Zimmerman,

Purcellville, has joined the staff of the Medical College of Virginia Hospital where he is doing special work. Dr. Keith M. Oliver of Lynnhaven will be established in Dr. Zimmerman's office during his absence.

Dr. Ennion S. Williams,

Medical Director of the Life Insurance Company of Virginia, Richmond, has been elected vice-chairman of the medical section of the American Life Convention.

Dr. William F. Grigg, Jr.,

Richmond, class of '42, Medical College of Virginia has assumed his new duties as a member of the staff of the City Hospital in Asheville, North Carolina.

Dr. H. R. Coleman,

Class of '29, University of Virginia, who has been practicing in Wilmington, N. C., has located in Lynchburg where he will specialize in diseases of the eye, ear, nose and throat.

Dr. John Sargent Morris, Jr.,

Class of '43, Medical College of Virginia announces the opening of his office at 3610 Fort Avenue, Lynchburg, with practice limited to diseases of infants and children.

Dr. Edwin J. Palmer,

Roanoke, announces the removal of his office to 1102 South Jefferson Street, that city. He is specializing in psychiatry and neurology.

Dr. A. L. Herring, Jr.,

Richmond, has returned to the Lahey Clinic, Boston, for further surgical training where he will be for from six to twelve months. He spent six months at the Clinic in 1944 and since then has been associated with his father, Dr. Herring, Sr., at Grace Hospital, doing general surgery.

Splendid Opening

For young doctor to take over lucrative practice in town of 3,000 population. Large agricultural community, nice eight-room office, fully equipped—formerly occupied by doctor doing general practice for twenty-five years. If interested, write Harrison Drug Company, Enfield, N. C. (*Adv.*)

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OBITUARIES

Dr. Francis H. Smith,

Former president, councilor and member of many committees of the Society, died July 1, at his home in Abingdon. Editorial note of his passing is made in this issue of the Monthly.

Dr. Rufus L. Raiford,

Prominent physician of Southside Virginia, died in his sleep at his home in Franklin, on the night of June 25. A native of Southampton County, he moved to Franklin in 1925 after nearly twenty years of rural practice. Dr. Raiford was sixty-seven years of age and a graduate from the former University College of Medicine, Richmond, in 1906. With the help of his wife, he established the Raiford Hospital in 1929 and was actively engaged in its operation until a year ago when he retired because of failing health. This will truly be a memorial to his medical service. He was for many years secretary of the Southside Virginia Medical Association until its consolidation with the Fourth District Medical Society, and had always been actively interested in the Medical Society of Virginia. Besides his wife, he is survived by two sons, Drs. Morgan and Fletcher Raiford and a number of relatives.

Dr. Joseph A. Rucker,

Prominent physician of Bedford, died June 29th after an illness of several months. He was seventy-seven years of age and a graduate of the University of Louisville in 1893. Dr. Rucker was former resident physician of the National Elks Home and the Randolph Macon Academy. He was a surgeon of the Norfolk and Western Railway and received his gold pin for fifty years service last year. He was chairman of the Bedford Board of Health and had taken an active part in civic and medical organizations. Dr. Rucker had been a member of the Medical Society of Virginia for fifty-one years. Four children survive him.

Dr. Julian McGruder Robinson,

Well-known physician of Danville, died June 28th after an illness of three years. He was seventy-three years of age and a graduate of the former University College of Medicine, Richmond, in 1899 Dr. Robinson had practiced surgery in Danville for forty-five years and was for many years on the staffs of Memorial Hospital and Edmunds Hospital. He had been a member of the Medical Society of Virginia since 1903. His wife and two sons survive him.

Colonel Benjamin Beckham Warriner,

M.C., U.S.A., retired, died at Walter Reed Hospital on March 6th after a prolonged illness. He was a native of Burkeville and seventy-four years of age. Dr. Warriner graduated from the former University College of Medicine, Richmond, in 1896 and practiced for some time at Newport News, following which he served as a contract physician in the Philippines for eight years. He was commissioned in the Medical Reserve Corps of the U. S. Army in 1908 and entered the regular Medical Corps in 1930. Since his retirement in 1937, Dr. Warriner had made his home in San Antonio. He had been a member of the Medical Society of Virginia since 1897. His wife and two children survive him. A brother is Dr. W. R. Warriner of Crewe.

Dr. Charles Wallace Sale,

Retired Colonel of the U. S. Army Medical Corps, died in Fredericksburg on July 10th. He was sixty-three years of age and a graduate of the former University College of Medicine, Richmond, in 1907.

Dr. Taliaferro Clark,

Former assistant surgeon-general of the United States Public Health Service, died July 3rd, at the age of eighty-one. He was a native of Fauquier County, Virginia, and a graduate of the University of Virginia, Department of Medicine, in 1890.

Dr. Robert Richard Lee.

WHEREAS, Dr. R. R. Lee has ended his earthly labors and passed on to the reward awaiting all good physicians; and whereas, for fifty years Dr. Lee made distinct contributions to the practice of medicine in our county and was a valued member of our Society.

BE IT THEREFORE RESOLVED; First: That we express our sympathy to his widow and child.

Second: That we extol his faithfulness and devotion to the profession.

Third: That a copy of these Resolutions be sent to his widow, the Medical Society of Virginia, the newspaper of this county, and that they be spread on the minutes of the Patrick Henry Medical Society.

F. B. TEAGUE
J. A. SHACKELFORD
H. G. HAMMOND